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Title of Thesis — Titre de la thèse

ENGLISH CHRONICLERS AND THE AGRARIAN CRISIS OF 1309 TO 1324.

University — Université

UNIVERSITY OF ALBERTA

Degree for which thesis was presented — Grade pour lequel cette thèse fut présentée

MASTER OF ARTS

Year this degree conferred — Année d'obtention de ce grade

1979

Name of Supervisor — Nom du directeur de thèse

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ENGLISH CHRONICLERS AND THE AGRARIAN CRISIS OF 1309 TO 1324

by

© JOHN BRASEN RASMUSSEN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF ARTS

IN

HISTORY

DEPARTMENT OF HISTORY

EDMONTON, ALBERTA

FALL, 1979

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "English Chroniclers and the Agrarian Crisis of 1309 to 1324" submitted by John Brasen Rasmussen in partial fulfilment of the requirements for the degree of Master of Arts.

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ABSTRACT

The cold, wet, disease-ridden years of the second decade of the fourteenth century have been mentioned by many historians but few have attempted to describe the natural disasters of this period in detail, or to evaluate the political and social consequences in a way that recognizes the historical importance of those disasters. However, recent scientific researches into fourteenth-century conditions, especially into the geographical and meterological conditions, have thrown a great deal of new light on those troubled years, and have made possible the interpretation of a number of chronicle passages that before were neglected or regarded as unimportant. The result is that the Agrarian Crisis, as this collection of disastrous years has been called, emerges as a longer, more serious, and more complex event than it has hitherto been imagined to be. Furthermore, it must be viewed as one of the beginning phases of a general climatic deterioration in the fourteenth century. Similarly, the application of current scientific researches into animal diseases to the discussion of certain chronicle passages enables us to speculate that the 1319 animal mortality may have been algae poisoning, and this, too, demonstrates that the chronicle descriptions are sufficiently detailed that a more precise discussion can be based upon them. Altogether, recently developed scientific knowledge can be made to give new credibility and

importance to the chronicles and to force historians to take the Agrarian Crisis more seriously.

ACKNOWLEDGMENTS

I wish especially to take this opportunity to thank Dr. Blackley, my supervisor, not only for the benefits of his knowledge and experience in the last few years, but also for his patience and encouragement. At the same time thanks are due to those who generously gave specialized advice and assistance in scientific matters. These include Dr. Paul R. Gorham of the Department of Botany and John England of the Department of Geography, both of whom were invariably helpful to me. As well, my gratitude extends to my brother Joe, whose explanations and clarifications made a great deal of the scientific materials more accessible to me. I must insist, however, that none of the above are responsible for any errors or misapprehensions that may be found in my treatment of the material. Similarly, the responsibility for the opinions expressed remains mine alone.

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ABBREVIATIONS

C.U.P. . . . . Cambridge University Press

Econ. Hist. Rev. . . . . .Economic History Review

EHR. . . . . .English Historical Review

O.U.P. . . . . .Oxford University Press

RS . . . . . Rolls Series (*Rerum Britannicarum Medii Aevi Scriptores*)

SHR . . . . . .Scottish Historical Review

INTRODUCTION

Historiography and the Agrarian Crisis

The student of medieval chronicles may find himself in the position of being obliged to justify their intensive study. They were the first sources to be used by modern historians of the medieval period and it could be argued that, since they have now been worked so extensively, little new other than in the area of interpretation is likely to emerge from them.[1] Furthermore, he must be aware that there have been many attacks on the usefulness of chronicle accounts. Chroniclers have been accused of having a sloppiness of mind that caused their writings to tend towards fabrications and exaggerations, especially in areas in which modern historians place a premium on precision, such as in numerical information.[2]

Despite such objections, the English chronicles for the reign of Edward II (1307-1327) have a real contribution to make in a study of the famine years and the multiple agrarian difficulties of that period. Scientists who have developed a specialized interest in the historical climate, notable among them being the British scientists Justin Schove and Hubert Lamb, have worked assiduously to make new use of the chronicle accounts, and have focussed on a whole range of passages that for all practical purposes had been neglected, or at best, merely dabbled with. This mine of hitherto unused material in the chronicles encompassed all those passages that deal with natural and celestial

phenomena, such as earthquakes, auroras, exceptional storms, floods, frosts, comets, eclipses and so forth. Only a start has been made in the utilisation of this body of material, but what these passages have already been made to reveal turns out to have a very significant bearing on the study of the agrarian troubles during Edward II's reign. Not only does it greatly expand our understanding of what these agrarian troubles actually involved, but it also goes a long way towards increasing the credibility of the chroniclers.

Furthermore, the principal advantage of the chronicle accounts remains unquestioned, and applies as much here as anywhere else. Unlike the record sources, such as manorial accounts and official letters and documents, whose concerns are usually relatively restricted and immediate, the chronicles have a larger perspective about events that is at the same time authentic and contemporary. And although the chronicle accounts represent only the viewpoint of an educated minority, it remains the only viewpoint from the period that we possess. In addition, as far as the social issues of the time are concerned, the viewpoint of the fourteenth-century chroniclers may lay claim to a certain broadness of outlook, at least in this writer's opinion, since their accounts evidence both a concern for the poor as well as an understanding of the rich and powerful. Surprisingly, however, the modern historians of the general history of England in this period have so far made very little use of these benefits of the chronicle accounts in their treatment of the agrarian difficulties of Edward II's reign. They have, admittedly, cited the chronicles in describing the famine, and have followed their assessment of the

two worst years, 1315 and 1316, by referring to them as outstandingly bad years. But they have not reflected the continual and unrelenting complaining of the chroniclers about the constant agricultural failures and meteorological adversities throughout the rest of this period.

Indeed, before any attempt is made at re-examining and re-appraising the chronicle evidence for the years of agrarian hardship in Edward II's reign, it might be instructive to look at the present treatment of those events by historians. First of all, the most dramatic of the hardships, the famine itself, which was Europe-wide and of exceptional severity, has been given much more attention than the other related events, but even then the overall tendency on the part of historians of general European history, and even more, on the part of historians of general English history, has been to avoid any in-depth treatment. And while research into its nature and its cause, though not extensive, has nevertheless led to some rather interesting advances in this century's historical knowledge, these advantages have yet to be assimilated or absorbed into the general historical literature in any significant way.

"The famine of 1315-17," as it has been generally called,[3] has been described in very severe terms by a number of historians: James H. Ramsay, for example, quotes Thorold Roger's statement that "at no time in English history has a dearth of such magnitude occurred,"[4] and T.F. Tout, in one work, speaks of the famine as "raging"[5] and states that in 1315 "great floods swept away the hay from the fields, and drowned the sheep and cattle."[6] But while such strong general statements may be found in a number of instances, they rarely amount

to more than brief lip-service, and few historians show the famine as having had any real or important ultimate consequences.

Take the economic situation at the time as an example. J. Thorold Roger's price study has shown that, as the chroniclers stated, the famine resulted in extremely high prices over an extended period.[7] However, little work has been done to examine what the consequences of the high prices were. The histories contain numerous vague statements that indicate that the famine did have consequences, but there has been no effort to analyze its effects in detail or in any way to define their extent.[8] Typical of this is James Conway Davies's study of the baronial opposition during Edward II's reign. Davies mentions the famine at one point as an event that "entered in to complicate the general situation,"[9] but nowhere does he actually consider how the economic hardships caused by the famine served to aggravate the disputes between the king and his barons, not even in the cases in which financial matters were involved. J.R.S. Phillips in his biography of Aymer de Valence says that the famine might have made the defence against the Scots more difficult, for he asserts that "the state of the Scottish March in 1315 and 1316 was very precarious, partly because of the king's lack of adequate financial resources, but also because of the exceptionally wet weather in 1315 and the scarcity and high cost of supplies in 1316."[10] This is an interesting observation but he does not pursue the matter; it is the only reference to the famine in his book. Furthermore, it presents the king's lack of financial resources and the wet weather as separate problems without reflecting that the first might have been caused by the second.

There are a number of very obvious questions, then, that remain unanswered, not only about the financial consequences of the famine, but also about the consequences of the series of poor harvests that have been shown to have preceded it. For instance, were the financial restraints put upon the king by the Ordainers in 1310 merely the result of Edward's extravagance, or was the price rise of that year a contributory cause?[11] Was Edward II's loan from Pope Clement V in January of 1314 of 160,000 florins solely a consequence of his need for money in his struggle against his opponents, as Phillips states,[12] or did he also have a need to borrow money simply to maintain a state of financial normality in the face of the ravages of the growing famine conditions? Edward made many heavy borrowings throughout his career--one in November 1317 from the Bardi for 10,000 marks stands out--and the same question might be asked of all of them: did the Agrarian Crisis have anything to do with these loans, even indirectly?[13]

The king was not the only member of the nobility having serious financial problems. Thomas Earl of Lancaster had his share as well. In his biography of Lancaster, J.R. Maddicott paints a very gloomy picture and states that Lancaster was reduced to "trying to add to his normal sources of income by heavy pressure on his tenants and neighbours."[14] Maddicott is far more aware of the famine than any other general political historian of this period, and he attributes many of the financial problems of the Earl of Lancaster and other magnates to this cause. In his words:

> The Earl's position, like that of all other landowners, was undoubtedly worsened by the famine years of 1314-17. For the honour of Tutbury, the only area studied in detail, it has been calculated that the rent income of the estates from money rents, tallages, sales of work, and cert money on thirteen Derbyshire manors was about 30 per cent lower in 1321-2 than in 1313-14.[15]

The only other earl about whom a detailed study has been made,[16] that is, the Earl of Pembroke, had a similar burden of economic woes. His difficulties cannot be attributed directly to the Agrarian Crisis since they stemmed primarily from his efforts to pay the £10,400 ransom that he had promised Jean de Lamouilly. The latter had held him prisoner in France in 1317. But the coincidence that every magnate that has been studied, the king included, had extraordinary financial difficulties of one kind or another, suggests that the Agrarian Crisis was a serious factor in aggravating every problem of this kind. The ransom in effect impoverished Pembroke. As Phillips puts it:

> It seems likely that Pembroke was financially ruined by the effects of paying off his ransom and was dogged by financial troubles the rest of his life, all the more so since he probably did not succeed in paying the whole of the ransom.[17]

£10,400 was a large sum, even for an earl, but under normal conditions it would have been possible to get help from the king to pay it, especially in the case of an earl that was as important to the king as was Pembroke.

It is not too much, then, to presume that the Agrarian Crisis had its effect in these matters as well, but it would be desirable to know how much of an effect. When other areas besides the Earl of Lancaster's "honour of Tutbury" have been examined in detail, then it might become possible to approximate the immediate economic consequences

of the famine and Agrarian Crisis on the nobility. Only then can we begin to discuss the political consequences.

First of all, the famine must be taken seriously. So must the whole series of bad years surrounding it, known collectively as the Agrarian Crisis, and in order for that to happen there has to be a better understanding of what those events actually were, let alone what their effects were. Every account, for example, differs concerning the duration of the period of serious hardship; some date it from 1315 to 1322, others from 1314 to 1317, and yet others give it only a three-year span, from 1315 to 1317. Was excessive rain the only cause, or was it also a matter of increasing cold causing a shorter growing season? To what extent were famine-related diseases involved, in both humans and in animals? Was the sheep murrain in 1315 and 1316 simply foot-rot caused by the wetness, or was something more devastating involved?

These are only some of the questions which need to be asked about the actual nature of the Agrarian Crisis. There remains a very central question, but any attempt to answer it leads straight into a very thorny controversy. The question is: did the famine involve human deaths in any great magnitude, and might it be considered to be a demographic turning point?

The controversy that this question gets involved in is that concerning the pre-Black Death demographic trends and their causes, and a few words on the history of that discussion might well be the best way to present its main aspects here. First of all, economic historians studying the consequences of the Black Death increasingly found

that the problems that the plague was said to have caused existed even before 1348. In the words of R.A. Pelham, writing in 1951, "it is now generally appreciated that the Black Death merely accelerated the changes that it was formerly thought to have originated."[18]

One of the main changes referred to is the population decline. Demographers found that even before the Black Death, that is, in the preceding half-century or so, the population had begun to decline, or at least its growth had levelled off.[19] According to M.M. Postan,[20] one of the leading English economic historians for the medieval period, and others,[21] this was due to the fact that by the end of the thirteenth century the population had reached the limits that the land could support; the thirteenth century had witnessed a continuing process of assarting and land reclamation in order to support a growing population and by about the year 1300 only the worst of the marginal land remained. In this situation, then, with the resources of the land strained to the limits, the least occurrence of untoward circumstances, such as a bad crop or an animal murrain, would have a cost in human lives. In this analysis the famine is merely one of the untoward dircumstances or "Malthusian checks," which set back the population before 1348.

The problem with this approach is that soil exhaustion on a large scale in the fourteenth century can only be argued on the basis of circumstantial evidence, and the main pieces of circumstantial evidence in this case are the abandonment of land and the drop in population. The shortage of land could easily cause a rise in mortality, but a rise in mortality could just as easily cause widespread

abandonment of land. Indeed, it certainly would cause this. In other words, there is a serious danger that the economic historians may, to a certain extent, be reversing cause and effect.

The only reason why all of these demographic and economic theories were not developed to explain the Black Death's mortality is that the virulence of the bacilli involved was considered sufficient explanation for the population loss and land abandonment that followed. Its very suddenness and its dramatic impact left no need to consider factors such as soil exhaustion as additional explanation for the mortality. Regarding the famine period, then, Postan's application of soil exhaustion theories is an indication that the mortality accompanying the famine was held to be considerably lower and less acute than that which would occur during a time of serious epidemic disease. As a result, the extent of the mortality is of considerable significance in determining the validity of the existing theories.

This catch in the demographer's theory has not gone unnoticed. W.C. Robinson, for example, has written an article which vigorously assails Postan's ideas. In it he asks a very pointed question on just this issue:

> We could say, looking at matters one way, that population increase was to blame, but why not equally the excessive rain, the marauding armies, or the plague bacteria? All the available demographic evidence points to the fact that once these immediate causes of high mortality were eliminated the population increased and continued to increase.[22]

It is apparent, then, that much rides on the question of how great the mortality was during the years of the famine. Few studies have been made on this question but those that have been carried out

suggest that the mortality must have been very high. A study of the famine in Ypres, for example, based on a burial register, shows that 2,794 deaths occurred there in the six month period between May and October 1316.[23] This would be about ten per cent of the population.[24] Kershaw, in his study of the Agrarian Crisis, estimates that in large towns and cities the mortality would have been much higher.[25] A significant study for England, based on the estates of the Bishop of Winchester, was conducted by John Titow, together with Postan, and also shows a very high mortality. In it Postan argues convincingly that the number of heriots constitutes a reliable indication of the death rate, and as such, indicates that in the years 1316, 1317, and 1318, the death rate was about twice the average for the period 1245-1327.[26] Indeed the evidence prompted Postan to remark that in 1317 deaths reached

> . . . a level very much higher than any other year before the Black Death. So high it was that, but for the Black Death itself, these years might well have left their mark in historical records and popular memory as the years of highest mortality in the Middle Ages.[27]

If one considers the chronicles, however, the mortality certainly did leave its mark on the historical record. The chronicles describe the mortality of the famine in almost exactly the same terms in which the Black Death is described. There are the same references to priests spending their entire day attending the burial of the dead,[28] which in London, because of their numbers, were buried in mass graves.[29] There are the same references to the impotence of the medicinal arts in treating the sickness,[30] to the scattered dead lying along the roads,[31] to the sick that lay uncared for,[32] and to the shortage of

men to till the fields.[33] There is a description of penitential processions instituted in the hope of averting further suffering for the people,[34] and there is even an estimate by one chronicler, Robert de Graystanes, that twenty thousand men died in London in 1315.[35]

On the basis of the chronicle accounts, and on the other evidence presented, it would not be unreasonable to speculate that fifteen per cent of the population died in the areas worst affected, or, in other terms, close to half as great a mortality as that generally estimated for the Black Death. Therefore, no theory of soil exhaustion need be invoked to explain the demographic downturn that preceded the Black Death. Soil exhaustion may very well have been a contributory cause, but there is no real basis for attaching a central and fundamental importance to it. Reasonable speculation, however, is not enough at this point, and more detailed studies of the records are needed with reference to the question of mortality.

There is another argument of Postan's which needs to be considered as well, mainly because it broadens the discussion in a way that is important if one is to gain a better understanding of what the Agrarian Crisis actually was. In Postan's opinion, the famine itself must not be considered a significant causal factor in the long-term hardships that followed it because "one or two decades of bad crops would not account for an economic trend lasting a century and a half."[36]

That point is in itself debatable, but one must also consider what the famine actually was. The meteorological irregularities that caused it, that is, the excessive wetness, can be viewed as merely a

part of a larger development, that is, of a climatic deterioration lasting at least a century and a half. As such, the famine would not only be a causal factor in itself but it would also be part of a larger causal factor that could very easily have affected the economy adversely for a hundred and fifty years. Shorter growing seasons brought about by the drop in temperature and more frequent harvest failures due to weather conditions would be the most immediate results.

Paleoclimatologists have treated this deterioration as fact since at least as early as 1964, when H.H. Lamb of the Meteorological Office was complaining that historians were ignoring its effects.[37] At the time, however, this was very understandable for the concept of the fourteenth-century climatic deterioration was still very new. But even now the years of the Agrarian Crisis have not been examined within the context of the climatological studies. Yet such an examination could very reasonably be expected to throw a considerable amount of new light on the actual nature of the crisis, and should be a central part of any thorough study of the Agrarian Crisis at this point.

The above remarks, however, are not meant to suggest that there have not been some studies devoted specifically to the famine. They are only to say that the studies that have taken place have merely been beginnings, rough attempts at sketching the barest outlines of what took place, and guideposts for future research rather than exhaustive researches in themselves.

The first of these studies was Henry S. Lucas's "The Great European Famine of 1315, 1316 and 1317," an article which appeared in *Speculum* in 1930.[38] Before this the only serious discussion of the

famine as it occurred in England was found in Dr. Charles Creighton's *History of Epidemics in Britain* which was published in 1894,[39] and which relied only on Trokelowe, and to a lesser degree on two or three other chroniclers, for its information. For what he had to say about the famine in England, Lucas, too, relied primarily on chronicle accounts, although he consulted considerably more chronicles than Creighton did, and did refer to a few documentary sources such as the Calendars of Close Rolls and Patent Rolls. However, as far as England was concerned, his work was really only an expansion upon Creighton's, and was by no means an attempt to be exhaustive, even as far as relevant chronicle passages were concerned. In fact, only the chronicle references that dealt directly with the famine were used, and not the ones that dealt with nature and weather observations of less immediate applicability.

In fact, Lucas's primary goal seems to have been simply to demonstrate the geographical extent of the famine. The famine had figured to a great extent in the histories of the various countries, but no one, before Lucas, had combined their scattered accounts to show the impressiveness of the disaster on the continental level: it extended to the Slavic parts of Poland and the area now known as the Baltic countries, and England was not the only place where there had been reports of cannibalism.[40]

Also, Lucas was interested in proving that the famine was an extremely serious one, one that was definitely worthy of such terms as "disaster" and "crisis."[41] He was, for that reason, interested only in the very worst years and limited his account to the three

years of total Europe-wide disaster. He did not consider the other years of grave hardship.

However, the next article on the famine to appear in English, and the most recent one, did concern itself with the temporal extent of the famine in England. This was Ian Kershaw's "The Great Famine and Agrarian Crisis in England 1315-1322,"[42] which attempted, on the basis of all of the reasonably accessible chronicle and documentary sources, to reconstruct in detail the events that took place. Since there was much in the way of disaster and hardship that did not apparently relate to the famine itself, for instance the animal mortality of 1319 and the destruction of goods and crops in the Scottish war, Kershaw borrowed the term "Agrarian Crisis" from the German economic medieval historians.[43] All together, Kershaw's study presented a picture of disease, and of unusual agrarian and economic hardship, that covered an eight-year span.

Kershaw, unlike Lucas, limited his study to the English situation, and he was able to cover far more English source material, especially documentary sources. Nevertheless, he was limited by the fact that he was attempting to write an article on a subject that demands a book, and consequently he found it necessary to point out that his paper offered "no more than a preliminary dip into the evidence and a summary of first findings."[44]

Despite this qualifying remark, however, it is far more in the gathering of the evidence than in the analysis of it, that Kershaw's study exhibits completeness. The value of the work is that even though it is "a preliminary dip" it is the largest and most thorough

presentation available of the evidence that can be gained from the two main categories of source material--chronicles and administrative documents. This preparatory groundwork was long overdue.

Still, there is a third category of "source material" that Kershaw did not deal with, but which nevertheless has a particular relevance to the study of the Agrarian Crisis. This is the category of evidence which we have not received by way of the medieval pen, evidence which has somewhat the nature and significance that archaeological remains have to the classicist. Archaeology has played little role in the reconstruction of medieval English history, especially that of the fourteenth century (although its importance is growing);[45] however, there exists a recently developed and growing body of scientific research which has a great degree of applicability to the study of history. A very significant part of this research, which tends to be broad in its scope and interdisciplinary in nature, is the paleoclimatological study of the historical past, which by itself is able to shed an enormous amount of light on the conditions which prevailed during that key period of the fourteenth century which Kershaw named "The Agrarian Crisis."

It is this third category of evidence, that supplied by recent scientific research, that is the reason for this thesis. To state it simply, the non-written evidence for the Agrarian Crisis has never been examined as a whole. Nor has it been examined in conjunction with the written evidence, the most important of which consists of those miscellaneous chronicle passages that deal with the unusual natural events of the time. It is the purpose of this thesis to begin that task.

To deal with the Agrarian Crisis in this way with any real thoroughness would be an immense undertaking: most historical studies are advances upon, and additions to, previously established work, in the sense that they do not go too far from their starting point; in this case the very meagreness of the starting point even further limits the scope of this study. This thesis, then, hopes merely to begin the groundwork for the next logical step in the process of researching the Agrarian Crisis, and as such, it is not so much the harvest resulting from a new approach to the study as an attempt to prove that a rich harvest is in store if that approach is taken.

"Non-written evidence" would at first sight appear to be a relatively unimportant factor in the reconstruction of fourteenth-century English history, especially the political history. The role of the "fourteenth-century ecology" in all its aspects, from climate and geography to bacteriology, has been of only slight concern to the historian. This was partly because of the fact that, until recently, only a very limited amount of usable information was available to the historian for the study of this aspect. But it has also been due to an underlying prejudice which to a great extent was caused by the wildly exaggerated claims of those who would make climate and related factors the key to history, one of the most notorious examples being Ellsworth Huntingdon's *Climate and Civilization.*[46] Consequently, in most historical accounts of medieval periods "nature" stays in the background and does little to upset the course of events. There are, of course, exceptions, such as the attention given to the Black Death,[47] but on the whole human activities are made to dominate the causation of historical events almost exclusively.

The dual task of presenting the new knowledge about the environmental factors that prevailed during the early part of the fourteenth century and the examination of the relevant chronicle accounts in the light of these factors has led to the adoption of a two-part format in structuring the thesis. In Chapters One and Two, the chronicle-writing pertinent to the reign of Edward II in general, and to the Agrarian Crisis in particular, will be examined, and a composite chronicle picture of the events of the Agrarian Crisis will be presented. In Chapters Two and Three, the scientific researches applicable to the period will be dealt with in the context of the information supplied by the chronicles, and compared to the composite chronicle picture.

In the treatment of the chronicle sources only the national chronicles, those whose primary focus is on the nation as a whole, will be considered. This is both for practical reasons,[48] and also because only those chronicles with a national perspective can reasonably be expected to speak for England in general. (Even then, that is not always the case, since even the national chronicles contain many observations on local conditions, but generally a larger-than-local perspective does tend to dominate in these chronicles in this respect.)[49] Also, it should be noted, the chronicles will be examined not only for what they have to say about the Agrarian Crisis and the related aberrations of nature during this period, but they will also be examined in terms of what is known about their authors and the circumstances in which they were written, as well as what biases and evidences of reliability have been imputed to them.

In the first chapter, then, the focus will be on the chronicles that were written during Edward II's reign and the years of Edward III's minority. The inclusion of the chronicles written between the years 1326 and 1330 is to a great extent due to the fact that there were a significant number of chronicles written, or at any rate, completed, during those years. These chroniclers were men who wrote of the reign of Edward II with the advantage of having lived through it, and they wrote of it at a time when its troubles would still have been fairly fresh in their memories.

The first chapter will deal as well with those chronicles that were written during Edward II's reign but which do not concern themselves with that reign. It will be apparent that for the most part these were compiled in the beginning of the reign, before the Agrarian Crisis. It will also emerge that the crisis years were a time of almost no chronicle-writing. What little of it there was, was backward-looking and gave scant treatment to the present or immediate past.

The chronicles that were written during Edward II's reign, and which at the same time dealt with the reign, were for the most part written towards the end. There was also the same phenomenon upon Edward II's death, as with his father's death, of a new impulse in chronicling activity, and the chronicles written immediately after his death form, for all practical purposes, a single body with those written towards the end of the reign. These "chronicles of the twenties" as they might well be called will be found to concern themselves more with the first years of the Agrarian Crisis than with its

last years, and will be seen to be correspondingly more full in their treatment of its beginnings.

Conversely, the chronicles written after 1330 are fuller in their treatment of the last years of the crisis and provide, for example, more detailed accounts of the animal mortality of 1319. These chronicles form the subject of the second chapter. Some of the writers of these chronicles may have lived through the Agrarian Crisis at a conscious age but there can be no certainty of this in any instance. Hence, as a group these chronicles must be considered less reliable, although a couple of them are vivid and circumstantial enough in their accounts to merit being treated as exceptions.

In the second part of the thesis, Chapter Three will be devoted to the findings of present-day scientific research into fourteenth-century meteorological conditions. Through comparison of these findings with the chronicle accounts, and, where helpful, to the various researches into fourteenth-century prices, it will become abundantly clear that the period of suffering caused by unusual weather conditions must be extended to cover the span from 1309 to 1324, practically the whole of Edward II's reign. Furthermore, it will be demonstrated that the famine did in fact occur in the larger context of a climatic change. The unusual meteorological conditions--and these include the increased cold and the unseasonal storms mentioned by the chroniclers as well as the excessive rain--were the erratic accompaniments of a climatic cooling that was to last at least a century and a half. Although the exact mechanisms of the climatic change are far from clear at this time, it will at least be

evident that the Agrarian Crisis was one manifestation of this larger development. It will also be evident that there are a considerable number of chronicle passages that are pertinent to the discussion.

The fourth chapter will be devoted entirely to the animal mortality of 1319, an event which a number of chroniclers single out in their accounts as being somehow distinct from the general famine misery. In an attempt to replace the vague medieval terms such as "murrain" and "mortality" with a more precise picture of what actually took place, three possible explanations will be considered in detail. One of these, that it was rinderpest that was the primary cause of grief in 1319, was first proposed, without any discussion, by Kershaw in his 1973 article. The other two possible explanations, either that it was anthrax or that there were numerous cases of algal toxification affecting many different kinds of animals, will here be proposed for the first time. These two alternatives will be shown to correspond much more closely with the chronicle evidence, especially the latter, and although no hard and fast conclusions can be drawn concerning these various possibilities, it will be clear that the effort at identifying the disease or situation involved will help to raise new questions and suggest alternative and productive avenues of research. It is a curious fact, for instance, that both anthrax and algae poisoning have been associated with certain weather conditions and in this way the whole question gives added significance to the meteorological researches of the third chapter.

This thesis, then, constitutes an argument for two central points. The first is that what has been called the Agrarian Crisis

was in reality a far more serious and complicated series of events than historians have acknowledged it to be. And the second point is that it is through a third category of source material, scientific researches that are climatological and environmental in scope, that the seriousness of the Agrarian Crisis becomes more apparent.

While the natural history of the fourteenth century may be said to have a special interest of its own, it is primarily the interest that it has for human history and for the ramifications in the sphere of human events that has prompted this study. Hence, the question of its political, social, and economic consequences remains both the starting point and the endpoint of this thesis. It is hoped that the conclusions about the seriousness of the famine and the Agrarian Crisis will provide a basis for the acceptance of any future arguments that will attribute consequences of comparable seriousness to these events. Although the bulk of the thesis concerns itself with what the crisis actually was and not with what its indirect political and economic results were, it will not be out of place to present here a couple of examples of possible indirect consequences of the Agrarian Crisis.

It has already been shown, principally through reference to Postan's and Titow's study of heriots, that the mortality was high among the peasants in the years 1315 to 1317. But what of those people that counted in the worldly sense, the rich and the politically powerful? It is interesting to note that more bishops, for instance, died between 1315 and 1317 than in any other three consecutive years in the fourteenth century, the years of the Black Death

included. Now the episcopacy is, admittedly, not a large enough group to enable one to draw conclusions of real statistical validity, and without knowing precisely the cause of death in each instance we cannot estimate the role of extraneous factors in bringing about the death of almost half the English bishops in three years.[50] Nevertheless, our sample is complete, even though it is small (we know the death date of every fourteenth-century English bishop) and we are left with the coincidence that more bishops died during this period of famine and disease than at any other time. Simon of Ghent, Bishop of Salisbury, died 2 April 1315 and William Greenfield, Archbishop of York, died on 6 December of the same year. In 1316 four bishops died: John Ketton, Bishop of Ely, on 14 May; Henry Woodlock, Bishop of Winchester, on 28 or 29 June; Richard Kellaw, Bishop of Durham on 9 October; and Gilbert Segrave, Bishop of London, on 18 December. In the following March two more bishops died; Richard Swinfield, Bishop of Hereford, on 15 March; and Walter Maidstone, Bishop of Worcester, on 28 March.

The deaths among the leaders in England, especially among the bishops, did not go unnoticed at the time. The author of the *Flores Historiarum* concluded his entry for 1315 with these words:

> In the course of the year's bitterness, the passage of which is drawn out from day to day, divine power withdrew from the kingdom ecclesiastical men of profound counsel, and likewise some very vigorous knights, to the greatest cost of the nation. For Magister William Greenfield, Bishop of Salisbury, Richard de Kydington, Abbot of Westminster, Sir Guy, Earl of Warwick, upon whom depended the remarkable defense of the realm in repressing the assaults of false men, Sir Robert, son of Payn, and Sir Edward Burnel, barons, praiseworthily paid their debt to nature full of faith.[51]

The deaths of so many bishops all at once would have been singularly consequential, since the king had the appointment rights of the bishop in a voided see. Thus not only through bringing his weight to bear in the usual manner on the selection of new candidates for the episcopacy but also through providing for all the positions that these bishops would normally have had the responsibility to find candidates for, Edward II was given the opportunity of a century to shape the higher clergy into a body that strongly supported the king. There was one serious difficulty for Edward in implementing this programme,[52] however, and that was the new papal policy. Pope John XXII had recently come to the papal throne, and had found on his accession a curia that was financially weakened by the famine as well as by the cost of a two-year interregnum.[53] Possibly for this reason, as well as others, he issued the papal constitution *Execrabilis* in 1317 condemning pluralism. In this way he created artificially circumstances similar to those that the famine mortality had already brought about in England, for it "led to wholesale resignations of benefices in England, as elsewhere."[54] By reserving to himself the right to make new appointments to the benefices made vacant through these resignations, the pope benefitted and, perhaps without being directly aware of it, prevented the papacy from suffering any real political consequences through the eight episcopal deaths. Primarily, however, the king was moving at that time to use the higher clergy as a political force against the baronage, and not the papacy.[55]

Nevertheless, partly as a result of the famine mortality, and partly as a result of the action of the papacy, the situation was such

in 1317 that there was then an almost unheard-of number of ecclesiastical vacancies. And the advantages of obtaining the right to fill any or all of these was sufficiently great that it brought a renewed tension to the age-old conflict between king and pope over the question of provisions.[56] The benefits of the right to appoint were economic as well as political for the vacant benefices could be a means of paying one's supporters without using money.

It remains to be considered whether some of these bishops might have died of typhoid fever. The chroniclers, with the exception of Trokelowe, wrote vaguely of a human mortality which was caused both by starvation and "pestilence." Modern historians have generally adopted a similar vagueness by referring merely to "famine sickness" in their descripiions of the mortality. Trokelowe, however, was more descriptive and stated that "dysenteric disease, gotten from rotten food, polluted almost everyone; a sharp fever followed it with a goitrous contagion."[57] Typhoid fever fits this description perfectly. It is contracted by means of contaminated food or water and is commonly accompanied by persistent fever and diarrhea.[58] Kershaw, in his article, suggested typhoid, although hesitantly, remarking that "a virulent and widespread epidemic of an enteric type--perhaps typhoid"[59] added greatly to the death toll. Kershaw's guess deserves greater comment and elaboration than he gave it, however, especially since certain epidemic diseases have been tied in with periods of cold, wet meteorological conditions.[60] As a result, the question of what the "famine sickness" of 1315 to 1317 actually was has now acquired a heightened significance or relevance.

The second example concerns the mining industry, which was experiencing a decline at this time. In a 1954 article in the *Scandinavian Economic History Review*, Norwegian economic historian J. Schreiner summarized the situation for Europe in general in these words:

> After some hundred years of progress in the output of minerals and metals, the miners experienced hard times towards the close of the Middle Ages. The production of gold and silver, of copper and tin, of iron and steel, possibly also of coal, diminished. The depression in all branches of mining and metallurgical industries lasted for several generations. This exhaustion, which appears to have come over all the mining regions, was occasioned by the fact that the mines had gradually become so deep that the miners were everywhere stopped by underground water.[61]

Although it is primarily the mines of Central Europe that were affected in this way,[62] Schreiner's statement certainly implies that these conditions existed generally and that they affected English mines as well. In any case, it has been shown that the resulting metal shortage, especially that of silver, was to have a pronounced effect on the English economy in the long run.[63] And as far as silver-mining was concerned, the "hard times towards the close of the Middle Ages" have been more precisely dated by other writers as starting around "the end of the thirteenth and the beginning of the fourteenth centuries."[64] In Bohemia, for example, "trouble seems to have begun in 1315, and led to some mines being abandoned in 1321."[65]

Schreiner's explanation for the widespread failure of the mines was repeated again in a 1974 article by N.J. Mayhew in which it was stated that "essentially Roman mining techniques failed to cope with the problems of flooding at the depths at which mining had by then

become necessary."[66] This explanation, however, has the central implausibility that it supposes that all of the mines that failed must have reached the same depth at about the same time. Such a coincidence could only reasonably be imagined if all the mines were roughly the same size, were begun at about the same time, and were worked at the same rate, which of course they would not have been.

Even before Schreiner's article, however, another explanation for the widespread flooding of the mines had already appeared in the scientific literature, and has since gained acceptance among scientists as the correct one.[67] In 1951, Dr. Axel Steensberg published an article in the journal *Nature* in which he stated that the wetness in the mines was a consequence of the change in climatic conditions throughout Europe.[68] To put it simply, the rain that was destroying the crops was also flooding the mines. In very wet years more effort would have been spent in draining underground water from the mines than in actual mining, and enough bad years in a short time would have made the affected mines sufficiently unprofitable to ensure their abandonment. Therefore, it is highly reasonable to conclude that the wet weather of the Agrarian Crisis was the single cause of the shut-down of a number of mines, and that the long-term climatic change towards increased wetness in a number of areas would have discouraged attempts to reopen them.

The foregoing instances of possible political and economic consequences from death within the English episcopate and the flooding of mines, both of which appear to be linked to climatic change, will not be investigated further in this thesis. The intent of the thesis

is to examine the Agrarian Crisis in some detail in order to show that it had an importance worthy of serious consequences that cannot be explained by generalizations. The special attention given to the animal mortality of 1319, an event that occurred outside the worst years of the famine proper, will serve as an illustration of the protracted nature of the general crisis and as an example of investigations that should be undertaken.

NOTES TO THE INTRODUCTION

[1] Attempts at justifying the study of chronicles in the face of this argument are found, for example, in Thomas Frederick Tout, "The Study of Mediaeval Chronicles," *The Collected Papers of Thomas Frederick Tout*, vol. 3 (Manchester University Press, 1934), pp. 23-25, and in John Taylor, *The Use of Medieval Chronicles*, Helps for Students of History series, no. 70 (London: Historical Association, 1965), pp. 5, 13.

[2] James H. Ramsay, *The Genesis of Lancaster*, vol. 1, The Scholar's History of England, vol. 5 (Oxford: The Clarendon Press, 1913), p. vi, in a discussion of the reliability and ability of chroniclers, manifested his antipathy to the point of remarking on "the very modest dimensions of all things medieval except the castles and the cathedrals." This kind of denigration is found also in a later publication that is commonly used as a historiography text, Harry Elmer Barnes's, *A History of Historical Writing*, 2nd ed. (New York: Dover Publications, 1962), which states (p. 66) that chronicle accounts are generally biased by "monkish distortions," although they should be excused because "the primitive and superstitious outlook of medieval historians upon life was something for which they could not be held responsible" (p. 97). (See also ibid., pp. 55-57.) Critical remarks which are not as prejudicial but which are still unduly severe can be found in Tout, "Medieval Chronicles," pp. 18-19, and in V.H. Galbraith, *Historical Research in Medieval England*, The Creighton Lecture in History, 1949 (London: The Athlone Press, 1951), p. 32.

[3] Daniel Waley, *Later Medieval Europe* (London: Longmans, Green & Co., 1964), one of the best general histories, especially when it comes to integrating social, economic and political history, refers to the famine in one instance as simply "the famine of 1315-17" (p. 99) and in another instance as "the famines of 1314-16" (p. 105). In the same way May McKisack, *The Fourteenth Century* (Oxford: The Clarendon Press, 1959), calls it "the famine of 1315-17" in her index (p. 577) and otherwise refers to it only by briefly describing famine conditions as background for the years 1315 and 1316. A couple of examples from modern French historians show a similar tendency to speak of it only in incidental terms: Jean Favier, *De Marco Polo à Christophe Colomb 1250-1492* (Paris: Augé, Gillon, Hollier-Larousse, Moreau et Cie, & Librairie Larousse, 1968), p. 128, refers to "*les trois étés pourris de 1314-1316*" and Jacques Heers, *Gênes au XV^e siècle: Activité économique et problèmes sociaux, Affaires et gens d'affaires*, no. 24 (n.p.: S.E.V.P.E.N., 1961), p. 23, speaks of a "*crise frumentaire de 1315-1316.*" In other words, no general

historian actually gives this famine a name, and this is the case even after the much-cited article by Henry S. Lucas which appeared in 1930 and which attempted to name it "The Great European Famine." See Henry S. Lucas, "The Great European Famine of 1315, 1316 and 1317," *Speculum*, vol. 5 (1930), pp. 343-377.

[4] Ramsay, *Lancaster*, pp. 82-83, quoting James E. Thorold Rogers, *A History of Agriculture and Prices in England*, vol. 1 (Oxford: The Clarendon Press, 1866), p. 198.

[5] T.F. Tout, *The History of England from the Accession of Henry III. to the Death of Edward III. (1216-1377)*, The Political History of England, vol. 3 (London: Longmans, Green & Co., 1905), p. 266.

[6] Ibid.

[7] Rogers, *A History of Prices*, vols. 1-2, *passim*.

[8] Some more detailed statements about the consequences of the famine can be found in the specialized literature, although even these tend to be vague. For example, M.M. Postan, *The Medieval Economy and Society* (London: Weidenfeld and Nicolson, 1972), p. 105, argues that the fourteenth-century decline in the profitability of demesne cultivation dates from 1315 or thereabouts in most places. The implication, therefore, is that the famine was at least a significant contributory cause in this decline. A similar argument is presented in R.E. Glasscock, "England *circa* 1334," *A New Historical Geography of England*, ed. by H.C. Darby, chapter 4 (C.U.P., 1973), p. 156. In other places it is also argued that the famine was a contributory cause in the "reversal of agricultural production and population trends" in general (see Ian Kershaw, "The Great Famine and Agrarian Crisis in England 1315-1322," *Past and Present*, no. 59 (1973), p. 50). See also M.M. Postan, "*Rapport de M.M. Postan*," *Rapports, IX^e Congrès international des sciences historiques*, vol. 1 (Paris: International Committee of Historical Sciences, 1950; reprint ed., Nendeln, Liechtenstein: Kraus Reprint, 1972), p. 241.

[9] James Conway Davies, *The Baronial Opposition to Edward II* (London: Frank Cass & Co., 1918; reprint ed., New York: Barnes & Noble, 1967), p. 58.

[10] J.R.S. Phillips, *Aymer de Valence, Earl of Pembroke, 1307-1324* (Oxford: The Clarendon Press, 1972), p. 91.

[11] Kenneth H. Vickers, *England in the Later Middle Ages*, A History of England, vol. 3 (London: Methuen & Co., 1913), p. 90, writes the following concerning the establishment of the Ordainers: "That the grievances were mainly financial is proved by the order that no gifts of land, money or franchises were to be given to Ordainers nor to anyone else without their consent, that all taxes were to be paid into the Exchequer direct, and that those foreign merchants who had farmed the taxes in the past should be arrested, and kept in confinement till they had given a full account of the monies that had passed through their hands. The poverty of the Crown is as much the key to Edward II.'s reign as it was to that of his father." One wonders how much Edward should be considered guilty of actual prodigality and not simply of failure to adjust quickly enough to the growing economic hardship of the times.

[12] Phillips, *Aymer de Valence*, p. 197.

[13] For details of some of these loans, see ibid., pp. 71-72, 107, 111, 152, *int. al.* In a note, p. 92. Phillips states that "Edward's financial problems are, however, so complex that they require a separate detailed examination, which is not possible in the present work." Such an examination would go a long way towards clarifying the nature and actual extent of the economic consequences of the crisis. John Gilchrist, *The Church and Economic Activity in the Middle Ages* (London: Macmillan, 1969), p. 85, writes that "in England the Crown's expenses increased from between £40,000 to £70,000 in c. 1300 to an average of roughly £200,000 in the 1320's," and he attributes much of this simply to inflation. At this point, however, to say how much was due to inflation would mostly be a matter of guessing.

[14] J.R. Maddicott, *Thomas of Lancaster 1307-1322* (O.U.P., 1970), p. 33.

[15] Ibid., p. 31. Maddicott draws his information on the honour of Tutbury from J.R. Birell, "The Honour of Tutbury in the Fourteenth and Fifteenth Centuries" (M.A. thesis, Birmingham University, 1962), pp. 53-57. Maddicott also points out, p. 163, that "the rapid rise in prices greatly increased the difficulties of purveyance and supply to the northern garrisons, while famine and disease undoubtedly helped bring about the king's shortage of ready cash." Maddicott is alone in making the connection between the famine and the king's financial embarrassment, and he even supports it with some detailed information. This is, nevertheless, only a beginning and much research on the subject needs to be done.

[16] See note 7.

[17] Phillips, *Aymer de Valence*, p. 197.

[18] R.A. Pelham, "Fourteenth Century England," *An Historical Geography of England before A.D. 1800*, 3rd ed., ed. by H.C. Darby, chapter 6 (C.U.P., 1951), p. 230.

[19] See J.D. Chambers, *Population, Economy, and Society in Pre-Industrial England*, ed. with an intro. by W.A. Armstrong (O.U.P., 1972), *passim*.

[20] Postan, "*Rapport*," pp. 233-236. See also M. Postan, "Some Economic Evidence of Declining Population in the Later Middle Ages," *Econ. Hist. Rev.*, 2nd ser., vol. 2, no. 3 (1950), pp. 221-246, as well as M.M. Postan, "Medieval Agrarian Society in its Prime, England," *The Agrarian Life of the Middle Ages*, Cambridge Economic History of Europe, vol. 1, 2nd ed., ed. by M.M. Postan, chapter 7, section 7 (C.U.P., 1966), pp. 549-600.

[21] These views are expressed by Waley, *Later Medieval Europe*, p. 99, and Léopold Genicot, "Crisis: From the Middle Ages to Modern Times," *The Agrarian Life of the Middle Ages*, Cambridge Economic History of Europe, vol. 1, 2nd ed., ed. by M.M. Postan, chapter 7 (C.U.P., 1966), pp. 660-743. For a good brief survey of the proponents of the view that population decline was the primary cause of the economic deterioration in the first part of the fourteenth century, as well as the critics of this view, see Gilchrist, *Economic Activity*, pp. 83-98. He summarizes the controversy for Europe in general.

Postan has very succinctly condensed his arguments in these oft-quoted words from his report at the Ninth International Congress of Historical Studies: "After a time the marginal character of marginal lands was bound to assert itself, and the honeymoon of high yields was succeeded by long periods of reckoning, when the poorer lands no longer new, punished the men who tilled them with failing crops and with murrain of sheep and cattle. In these conditions a fortuitous combination of adverse events, such as the succession of bad seasons in the second decade of the fourteenth century, was sufficient to reverse the entire trend of agricultural production and to send the population figures tumbling down" ("*Rapport*," p. 235).

[22] W.C. Robinson, "Money, Population and Economic Change in Late Medieval Europe," *Econ. Hist. Rev.*, 2nd ser., vol. 1, no. 1 (1959), p. 75.

[23] Lucas, "Great European Famine," pp. 368-369.

[24] Ibid.

[25] Ian Kershaw, "Agrarian Crisis," p. 11.

[26] M.M. Postan and John Titow, "Heriots and Prices on Winchester Manors," *Econ. Hist. Rev.*, 2nd ser., vol. 11, no. 3 (1959), pp. 392-417. The study covers the period from 1245 to 1350 and deals with five Winchester manors. The *average* death rate for the period 1245-1347 would be high in itself, since it includes the period of increased mortlaity that preceded the Black Death. This is borne out by the fact that 1289 is the first year that the heriots go above the average, which is 70, and that the average for the period 1292-1347, a 55-year period, is 90 (see p. 399 of the article for the statistics). The figures for 1316, 1317 and 1318 are 121, 171 and 135, respectively.

Postan, who wrote up the researches that Titow had conducted, is very careful to present and deal with all the difficulties that the statistics could possibly present. On the whole, it must be said that the number of heriots is not an absolute figure for the death rate on the manors in question but only a relative one since it does not include those that cannot inherit--i.e. wives and children. Postan admits that there may be some change in the age group represented by the heriots over the hundred-and-fifty-year period but that it would not be enough to deprive the evidence of "its economic significance" (p. 402).

[27] Ibid., p. 407. That Postan considered the Winchester mortality to be fairly representative of conditions in England in general for those years is indicated by his later statement that the mortality for the famine years was as high as 10 to 15 per cent (*Medieval Economy and Society*, p. 37).

[28] *Nicolai Triveti Annalium Continuatio*, ed. by Anthony Hall (Oxford: n.p., 1722), p. 18. For a good survey of the chronicle description of the Black Death, see Philip Zeigler, *The Black Death* (n.p.: Collins, ,969; reprint ed., Harmondsworth, England: Penguin Books, 1970), *passim*.

[29] *Triveti Continuatio*, p. 18.

[30] John Trokelowe, *Johannis de Trokelowe et Henrici de Blaneforde, Cronica et Annales, Chronica Monasterii S. Albani*, vol. 3, ed. with an intro. by Henry Thomas Riley, RS, no. 28 (London, 1866), p. 94.

[31] Robert de Graystanes, *Historiae Dunelmensis Scriptores Tres, Gaufridus de Coldingham, Robertus de Graystanes et Willielmus de Chambre* (London: Surtees Society, 1934), p. 96; Trokelowe, *Annales*, p. 94.

[32] *Annales Monasterii de Bermondeseia, Annales Monastici*, vol. 3, ed. with an intro. by Henry R. Luard, RS, no. 36 (London, 1866), p. 470.

[33] Henry Knighton, *Chronicon Henrici Knighton, vel Cnitthon, Monachi Leycestrensis*, vol. 1, ed. with an intro. by Joseph Rawson Lumby, RS, no. 91 (London, 1889), p. 412.

[34] *Annales Paulini, Chronicles of the Reigns of Edward I and Edward II*, vol. 2, ed. with an intro. by William Stubbs, RS, no. 76 (London, 1883), p. 278.

[35] Graystanes, *Historiae*, p. 96.

[36] Postan, "*Rapport*," p. 234.

[37] H.H. Lamb, *The English Climate* (London: The English University Press, 1964), p. 162, writes that "the effects of the deterioration from 1300 to 1500-1600 and after have commonly been ignored, presumably because they were heavily overlaid by the Black Death of 1349-50 and the recurring ravages of the plague thereafter." Historians, however, were worried more about whether or not the deterioration actually happened than what its effects might have been. Waley, writing in the same year as Lamb, and referring to the famine period, states that "there may also have been a climatic deterioration, with colder weather" (*Later Medieval Europe*, p. 99), and Genicot, writing in 1966, admits, with equal hesitation, that "a possible transformation of the climate" may account partly for the economic hardship ("Crisis," p. 660). Even as late as 1972 Postan displays a similar uncertainty and speaks only of a "possible deterioration of the weather" during this period (*Medieval Economy and Society*, p. 34).

[38] See note 3 above.

[39] Charles Creighton, *A History of Epidemics in Britain*, vol. 1, with additional material by D.E.C. Eversley, E. Ashworth Underwood and Lynda Ovenall (London: Frank Cass & Co., 1965), pp. 47-52.

[40] Lucas, "Great European Famine," p. 376.

[41] Ibid., p. 377.

[42] See note 8 above.

[43] The term "Agrarian Crisis" was first made popular through the writings of Wilhelm Abel, the most important of which is *Agrarkrisen und Agrarkonjunktur*, 2nd ed. (Hamburg: Verlag Paul Peray, 1966). The first edition appeared in 1935. Kershaw uses the term in a much narrower sense than that in which it is used by the German

scholars. While Kershaw applies it only to the period of hardship in the first quarter of the fourteenth century, they, on the other hand, use it to refer to the long-term malaises affecting the agricultural economy during the Later Middle Ages. (Cf. also Postan's review of Abel's *Die Wüstungun des Ausgehen Mittelalters* [1943] in *Econ. Hist. Rev.*, 2nd ser., vol. 3 [1950], p. 134.) Similar to this concept is "the crisis of the fourteenth-century" which has preoccupied many French historians and which includes long-term cultural and political problems as well as agricultural and economic ones. See, for example, R. Delatouche *"La Crise du XIV^e siècle en Europe occidentale,"* *Les Etudes Sociales*, n.s., vol. 42 (1959), pp. 1-20.

Throughout this thesis the term "Agrarian Crisis" will be used in the same sense as it was used by Kershaw.

[44] Kershaw, "Agrarian Crisis," p. 5.

[45] The growing importance of medieval archaeology is illustrated by the good reception of Maurice Beresford's recent work. His *Deserted Medieval Villages*, ed. together with John G. Hurst (Guildford, England: Lutterworth Press, 1971) along with his earlier *Lost Villages of England* (Guildford, England: Lutterworth Press, 1954) helped to pave the way for the publication of an article on this aspect of medieval archaeology in the *Scientific American* in 1976 ("A Deserted Medieval Village in England," vol. 235, no. 4 [October 1976], pp. 116-128) giving medieval archaeology an exposure it has rarely enjoyed.

[46] Ellsworth Huntingdon, *Civilization and Climate*, 3rd ed. (New Haven, Connecticut: Yale University Press, 1942). Huntingdon's insistence on the importance of climate is revealed in this telling remark from his introduction to the third edition: "In its present form the book does not insist as strongly as before upon the supreme importance of climate, but the arguments that lead to the conclusion that climate ranks with racial inheritance and cultural development as one of the three main factors in determining the distribution of civilization seem much stronger than previously." And further on (p. 3), he writes that "although climate may be no more important than other factors in determining the relative degree of progress in different parts of the world, it is more fundamental in that it is a cause rather than a result of the other factors."

[47] Science's contribution to the history of the Black Death has been principally to establish the distinction between the pneumonic and the bubonic plague and to outline the interractions among the human victims, the bacilli involved (*pasteurella pestis*), the bacilli-carrying fleas and their rodent hosts. However, even in the study of the Black Death science has had more to say of historical relevance than what the historians have made use of, and here, too, the possible role of weather conditions have been discussed. H.H. Lamb, *Climate: Present, Past and Future*, vol. 2 (London: Methuen & Co., 1977), p. 456, states that "it is even likely that the origin of the Black

Death itself in China in 1333 was connected with the disturbed weather of the times, since it followed upon a time of extraordinarily great rains and river floods in 1332, which not only are alleged to have cost seven million lives and destroyed human settlements and their sanitation arrangements but must have dislocated the habitats of wild life generally, including the plague-carrying rodents." In other words, the rodents would have wandered to new areas because of the weather.

48 The local chronicles are very plentiful. As G.A. Giles has pointed out, "almost every monastery, out of the hundreds which once covered the land, has left at least one chronicle or register of public events" (*Chronicon Angliae Petriburgense*, ed. with an intro. by G.A. Giles [London: Caxton Society, 1845], p. viii). Most of these are only of strictly local interest, however.

49 Nevertheless, a great deal of reference will be made to relevant passages from the local chronicles throughout the thesis. Usually there will be some reference to the fact that it is a local chronicle, but it can always be assumed by the reader that any chronicle cited is a local chronicle unless it is discussed in detail in the first two chapters.

50 It should be noted, too, that none of the four Welsh bishops died, so that the eight bishops represent half (eight out of seventeen) of the bishops in England proper. The coincidence is just too great for us to escape from having to connect these deaths with the famine, or, more precisely, with the epidemic disease that accompanied the famine. Granted the earls appear not to have been similarly affected, but at that time there were only ten and they were an unusually young group of earls (their average age in 1315 was thirty-seven years of age) and they belonged to an age group in which people are much less likely to fall victim to epidemic disease. Still, one of them, the Earl of Warwick, died in 1315.

51 *Flores Historiarum*, vol. 3, ed. with an intro. by Richard Henry Luards, RS, no. 95 (London, 1858), p. 169: "*In amaritudine quoque stadio hujus anni decursu indies protracto, viros ecclesiasticos profundi consilii necnon et milites strenuissimos, in maximum regionis dispendium, divina potestas regno subtraxit. Nam magister Willelmus de Grenefelde archiepiscopus Eboracensis, magister Symon de Gandavo episcopus Saresburiensis, Ricardus de Kydintone abbas Westmonasterii, dominus Gwydo comes de Warewyk, a quo dependebat reproborum ad insolentias reprimendas regni singulare praesidium, dominus Robertus filius Pagani et dominus Edwardus Burnel barones, naturae debitum fide pleni laudabiliter persolverunt.*"

It is interesting to note that in the Tintern version of the *Flores* (a fourteenth-century copy of the *Flores* in which additional remarks have been added) there is the statement that the mortality

of the year 1316 began with the King of France: "*Propter quam caristiam et cometum apparentiam, multa extunc mortalitas hominum; incipiente mortalitate ad regem Franciae*" (*Flores*, vol. 3, p. 340). Here then is another example, if this account is accurate, of the famine and its concomitant disease having a serious political effect. Louis X died in 1316.

52 Waldo E.L. Smith, *Episcopal Appointments and Patronage in the Reign of Edward II*, Studies in Church History, vol. 3 (Chicago: American Society of Church History, 1938), p. 49, argues that after the Lincoln Parliament of 1316 the king "adopted a definite policy of creating an episcopal baronage favourable to himself." And judging by Smith's chapters on advowson, this policy extended to lesser ecclesiastical positions as well.

53 Smith, *Episcopal Appointments*, p. 115, states that John XXII's main financial problem on accession was that Clement V had depleted the treasury. The coincidence of the two worst years of the famine occurring at the same time as the interregnum, when presumably only the most routine of the papal taxes would have been collected, must certainly have aggravated the situation left behind by Clement V.

54 Ibid., p. 99.

55 Ibid., *passim*, especially p. 112.

56 Smith points out, ibid., *passim*, that for both John XXII and Edward II the concerns involved in the question of provisions and the right of ecclesiastical appointments were primarily financial. Both were in bad straits financially and in a poor position to take uncompromising stands for the sake of principles alone.

57 Trokelowe, *Annales*, p. 94: "*Morbus enim dysentericus, ex corruptis cibis conceptus, fere omnes maculavit; quem sequebatur acuta febris, vel pestis gutturuosa.*"

58 *Harrison's Principles of Internal Medicine*, 7th ed., ed. by Maxwell M. Wintrobe, George W. Thorne, Raymond D. Adams, Eugene Braunwald, Kurt J. Isselbacher, and Robert G. Petersdorff (New York: McGraw-Hill, 1974), pp. 803-808. For a good short discussion of the history of typhoid fever and similar diseases, see Frederick F. Cartwright, *Disease and History*, in collaboration with Michael D. Biddiss (New York: Thomas Y. Crowell Co., 1972), p. 154 ff.

59 Kershaw, "Agrarian Crisis," p. 11.

60 John D. Post, "Meteorological Historiography," *Journal of Interdisciplinary History*, vol. 3, no. 4 (Spring 1973), p. 731.

[61] Johan Schreiner, "Wages and Prices in England in the Later Middle Ages," *Scandinavian Economic History Review*, vol. 2, no. 2 (1954), p. 67.

[62] Lamb, *Climate: Present, Past and Future*, vol. 2, p. 273.

[63] N.J. Mayhew, "Numismatic Evidence and Falling Prices in the Fourteenth Century," *Econ. Hist. Rev.*, 2nd ser., vol. 27, no. 1 (1974), p. 2 ff.

[64] Ibid., p. 2.

[65] Lamb, *Climate: Present, Past and Future*, vol. 2, p. 273.

[66] Mayhew, "Numismatic Evidence," p. 2.

[67] See Lamb, *Climate: Present, Past and Future*, vol. 2, p. 273, in which the mining situation is presented as evidence of climatic change.

[68] Axel Steensberg, "Archaeological Dating of the Climatic Change in North Europe about A.D. 1300," *Nature*, vol. 163, no. 4277 (20 October 1951), p. 673.

CHAPTER ONE

Chronicle-Writing from 1300 to 1330

In the fourteenth century most chronicles were written in the traditional format of annual entries which were usually introduced by a statement of both the regnal year and the year *Anno Domini*.[1] This format suggests a piecemeal, year by year, approach to the writing of history in which literary unity and long-term analysis were sacrificed in order that events might be recorded as they happened. The very appearance of such chronicles leads easily to the assumption that they are highly contemporary with what they recount.

This assumption, reasonable though it may be for earlier times, is a very dangerous one as far as the chronicles of the fourteenth century are concerned. Their format is largely a result of conditions and attitudes that prevailed in past centuries and is not really a true reflection of the fourteenth-century approach to historical writing.

Often when a new chronicle was begun the chronicler would copy out an old one, or sometimes even combine a number of old ones, to provide background information. Increasingly, chroniclers would contrive by some means or other to extend their chronicles as far back as the creation of the world; and in the fourteenth century it was not uncommon to have chronicles that contained no original material since they were compiled entirely from older chronicles and written long after the events they recorded. And while occasionally one finds chronicles

which are not contemporary with the events they describe but which nevertheless contain information that is not found elsewhere, it is usually supposed that these are based upon written sources which have since been lost, such as another chronicle or perhaps notes compiled by someone else for a chronicle that was never written. Furthermore, we know that chronicles which still followed the traditional format of annual entries were often written in short spaces of time, such as a year or two.

Much has been written on many levels in our own time discussing the difference between the chronicler and the true historian, and for many the difference seems to be primarily that the chronicler writes about his own time while the historian writes about the past. If that distinction is accepted, one finds that a significant portion of the chroniclers might more properly be called historians, in that they were not writing about events as they happened.

These generalizations about the state of chronicle-writing in the fourteenth century as a whole will be amply supported by the following detailed discussion of the chronicles and chroniclers of a much shorter period, the period of the Agrarian Crisis. The Agrarian Crisis certainly had conditions affecting chronicle-writing which were particular to itself, but these conditions do not alter the validity of the above generalizations. Indeed, they accentuate them if anything, since the conditions were not conducive to chronicling, and forced the chroniclers generally to fill the resulting gap in their historical record at a later date.

It can be said with certainty that the Agrarian Crisis was a time of almost no chronicling activity, but it is almost impossible to pinpoint exactly why this was so. One can imagine that in a time of food scarcity when people often had to go far afield to buy it, many monks and clerics spent time simply in procuring food and necessities that normally would have been spent in study and writing. And one can imagine that many of them suffered from the illnesses associated with the famine, or were overburdened with the daily chores of their brothers who were ill. But there is very little detailed information to supplement the imagination on this particular question. Perhaps the determining factor was merely the price of parchment, or even a psychological reluctance to concern oneself with the past while the present weighed so heavily.

In a way, this problem involves us in the larger, but essentially similar, question of what conditions actually were conducive in general to the writing of chronicles. Relative to this Antonia Gransden has argued that interest in events themselves, past or present, was an important motivation for chronicle-writing. With reference to the activity of chroniclers during the reign of Edward I, she wrote that his "struggle with the church and with the barons, and his Scottish and, to a lesser extent, his Welsh policy, acted as stimuli to historical writing."[2] She supported this statement by the argument that after these problems had resolved themselves somewhat, or after they had lost their immediate interest for the fervent patriot, many chroniclers stopped writing. Thus towards the end of Edward I's reign there occurred a dramatic drop in chronicle-writing.[3]

> A number of the chronicles stop either at or soon after the submission to Edward of the competitors for the Scottish throne, or towards the end of the century. The Waverly chronicle ends in 1291, in the middle of the competitors' letter of submission. The anonymous Norwich chronicle and the chronicle of St Benet of Hulme end just after the competitors' letter, and the Osney chronicle ends in 1293. Welsh affairs particularly stirred the interest of the Peterborough chronicler; he has virtually no interest in general history after the Welsh campaign of 1282-3 (though he does not end until 1295). The Dunstable chronicle ends in 1297 and Bartholemew Cotton and the Furness chronicle in 1298. Only six of the chronicles survived into the fourteenth century. The Bur[illegible] chronicle ends in 1301, the Worcester chronicle and Peter of Langtoft end in 1307 with the accession of Edward II, and Walter of Guisborough ends in 1312; the *Flores Historiarum* and the Canterbury chronicle continue to 1327.[4]

Miss Gransden thus shows that in the period before the Agrarian Crisis, beginning with the last years of Edward I, there was little interest in contemporary events. Chroniclers who had concerned themselves with such matters no longer did so.

The picture that she presents is by no means complete, however, and the following information should also be noted. The Franciscan chronicle which formed the basis of *The Lanercost Chronicle* ended with the year 1297. Its author, presumably Friar Richard of Durham, is believed to have written it between 1280 and 1297.[5] Also ending under the year 1297, and very probably completed at that time,[6] are the *Annales Cestrienses*, also called the *Chronicle of St. Werburg*.[7] *The Chronicle of the Thirteenth Century* ended with the year 1298,[8] and the *Annales Angliae et Scotiae*, which began with the year 1292, ended under the year 1300. Again, it is not known with certainty when either of these last two chronicles were written, although both were very probably written at that time.[9] By the same author as the *Annales Angliae*

et Scotiae is the *Opus Chronicorum*[10] which covered the years 1259 to 1296 and which was written between 1301 and 1308.[11] Worth mentioning as well is the unpublished Premonstratensian chronicle of Hagnaby which terminated *sub anno* 1307.[12]

Gransden's argument that decline in interest in the events may have been responsible for the sudden decline in chronicle-writing is further borne out by the *Annales Londonienses*. They were written later than the above chronicles, though probably not much later, and they begin merely as a copy of the *Flores Historiarum* from 1194 to 1301, with a gap from 1293 to 1300, which suggests that even at a later date these years were not considered to be of much importance.[13]

Of the chronicles that Gransden mentioned as extending into the fourteenth century, the following add even further to her picture of declining interest in chronicle-writing. It is the second continuation of the Bury chronicle that Gransden referred to as ending in 1301, the first continuation ends in 1296.[14] The Worcester chronicle, which ends in 1307, experienced a change in chronicler when its first author, believed to be Nicholas of Norton, ceased working at it at 1303.[15] And while Walter of Guisborough's chronicle continues to 1312, Walter of Guisborough himself was not the writer after the 1304 entry, or so its most recent editor, Harry Rothwell, argues.[16] What is more, there is good evidence to believe that the entire chronicle up to 1304 was written between 1300 and 1305.[17] As for the *Flores Historiarum*, most manuscript versions of it end with the year 1306,[18] and it is the continuation of it attributed to Robert of Reading, probably begun after an interval of a number of years, that ends at 1327. It is also

true that while the Canterbury chronicle extends to 1327, it is only a continuous chronicle to the year 1309 after which it is merely a series of fragments which occupy less than a page in the printed edition.

It seems that not only was it a time when chronicles that had been written over extended periods were being ended, but it was also a time when new starts tended to be very short-lived. It is apparent also that the drop in the writing of chronicles was even more pronounced than Gransden's statement indicates.

Furthermore, it is also evident that chronicling as an activity tended to occur in irregular spurts, and was subject to distinct short-term fluctuations in the number of chronicles being written. In fact even within the brief seventeen-year period of sudden decline in chronicle-writing discussed above, that is, the period from 1290 to 1307, there are marked fluctuations of lesser duration. These fluctuations tend to obscure the larger picture and make it very difficult to generalize about the long-term trends in the writing of chronicles. For this reason, statements such as James Westfall Thompson's concerning a general downward trend in the fourteenth and fifteenth centuries[20] obfuscate some aspects as much as they clarify others, since it is primarily by viewing the short term fluctuations that one is able to draw conclusions as to what actually motivates, or causes, chronicle-writing.

The question of cause or motivation becomes especially significant for this study when discussing the next seventeen years[21] of English chronicle-writing, the years 1308 to 1324, which not only

include almost all of the reign of Edward II but also include the whole of the Agrarian Crisis.

To begin with, the death of Edward I in 1307 after an eventful reign of some thirty-five years provoked a new, but short, revival in chronicling. Edward's death very probably created in the minds of the people a feeling that an age had passed and that it was time to record it for posterity in its completeness. Very soon after his death, so soon, in fact, "as not to bear any traces even of the earliest difficulties which beset his unfortunate son,"[22] the *Commendatio Lamentabilis in transitu magni regis Edwardi* was written. Strictly speaking, it was neither chronicle nor royal biography, but rather a eulogy of the deceased Edward.[23] Nevertheless, it is of some historical interest. It was written by a certain John, who might be John Bever, who in turn is usually, but not with complete certainty, identified with the chronicler John of London.[24]

At about this time, also, William Rishanger, a monk of St. Albans, began to write his *Gesta Edwardi Primi Regis Angliae*. Exactly when he started it, or how long it took him, is not known, but it is known that he was writing it in 1310.[25] He, too, chose to write a chronicle at this time specifically because of Edward's death, as he himself states in the third person:

> Since Holy Scripture says "Praise after death, proclaim what is sure," after the death of Sir Edward, the illustrious King of England, Brother William Rishanger, chronicler, committed a few things to writing, by recapitulating generally and concluding briefly, touching on many things, to the honour of God and the commendation of Edward's soul.[26]

About two years later,[27] Rishanger again showed himself to be more concerned with the past than with his own time as he began work

on a chronicle called *De Bellis Leues at Eusham* dealing with the wars of Simon de Montfort.

The next chronicle, after those written by Rishanger,[28] to which a date can be assigned with any degree of precision, is the *Annales Sex Regum Angliae* by the Dominican scholar Nicholas Trevet. It is known to have been written around the year 1320, for in his prologue Trevet "says that '120 years and more' had passed from the accession of King John."[29] As its title states, it deals with six kings of England, the last of which is King Edward I, so it also fails to come closer to its own time than the year 1307.

In many ways, however, Trevet's chronicle represents an unusual development in the world of chronicle writing. Not only is he the first Dominican in England to turn his hand to the writing of history,[31] but he also has the distinction of having acquired an international reputation in other literary fields first,[32] before he took up the writing of chronicles. He was a specialist in Biblical studies and classical history, and it would in no sense be far-fetched to suggest that it was through his study of Livy that he was inspired to try his hand at the writing of history. In any case, he cannot properly be regarded as a product of existing chronicle traditions.

The *Annales* constitute Trevet's first historical work, and his best, for that matter. He wrote two other chronicles, neither of which have merited publication in our time. The first is a world history to the time of Christ, which he wrote between 1327 and 1329,[32] and the other is a chronicle in Anglo-Norman spanning from Creation to 1285 or thereabouts.[33]

This, then, completes the list of those chronicles composed between 1308 and 1324 which do not deal in any way with the reign of Edward II, the reign in which they were written. It should be noted that in the case of Nicholas Trevet's *Annales* we have as good a basis as we will ever have for stating that a chronicle was actually written during the worst years of the Agrarian Crisis, that is the years from 1314-1322, and even here we are far from absolute certainty. A couple of chronicles, specifically the Westminster continuation of the *Flores Historiarum* and the *Annales Londonienses*, were very probably written during these years as well, but a statement to that effect is on much less sure ground.

This is not to say, however, that there is a lack of original chronicle accounts for the crisis years. There is not even a lack of contemporary ones, or rather near contemporary ones, for in the years immediately following the Agrarian Crisis there was a pronounced upsurge in chronicling activity. One cannot say definitely that this was due to a sense of security brought about by the economic recovery, but this suggestion may be advanced. The short period of peace that came with the defeat of Thomas of Lancaster at Boroughbridge by royalist forces in 1322 might also have created an atmosphere more conducive to chronicle writing. This, combined with an interest in the immediate past and a deeply impressed memory of it, may have contributed much towards bringing about that upsurge in chronicling activity. But whatever the reason for it, the result was a number of chronicles written so closely after 1322 as to be considered almost contemporary with the period of the Agrarian Crisis.

These chronicles, together with the other fourteenth-century accounts of the crisis years which contain information not found elsewhere, even though they were written later and are not contemporary, number some fifteen to seventeen chronicles in all. In the interests of clarity, these chronicles will be treated here in three separate groups or categories. The first will include only the almost-contemporary chronicles, the ones that were written immediately after the crisis years (or possibly even partially during those years as in the case of both the Westminster continuation of the *Flores Historiarum* and the *Annales Londonienses*).[34] The second category will include those chronicles which were written entirely, or almost entirely, after 1330 but during the early part of Edward III's reign.[35] 1330 is a significant date in other respects, too, for it marks the beginning of Edward III's *de facto* reign, that is, his emancipation from the tutelage of Sir Roger Mortimer. While this group of chronicles are not contemporary accounts as far as the crisis years are concerned, they are nevertheless accounts written by chroniclers who had themselves lived through those difficult times, and who could be expected to base at least some of their accounts on their own first-hand impressions. This category of chronicles will be dealt with in the next chapter, as will the third category, which will consist of those which were compiled by chroniclers who are unlikely to have experienced the Agrarian Crisis personally, but which nevertheless contain information on the crisis not found elsewhere.[36]

To begin with, then, let us examine the continuation of the *Flores Historiarum* attributed to Robert of Reading, which covers the

years 1307 to 1327. The last part, beginning after February 1326 in another hand, gives notice of the death of Robert of Reading at that point,[37] but as Antonia Gransden observes, this merely means that he died at that point in the composition of the chronicle, and not necessarily at the time being written about.[38] Hence it is difficult to state with any precision when it was written. The oldest manuscript of it is in a hand that dates from the first half of the fourteenth century[39] and "its near contemporaneity with the events it records is demonstrated by the fact that substantial blank spaces, some of more than half a column, are left at the end of each annal for the addition of late news."[40] This still does not make it possible to say more than that it was written some time between 1307 and, roughly, 1337. On the basis of opinions expressed in it, however, Gransden is inclined to assign its composition to the period "after the deposition of Edward II and before the fall of Isabella and Mortimer in 1330."[41] Although this is only guesswork, it places the continuation at the close of the revival in chronicle writing in the years following the famine.

While Reading's chronicle, according to Tout, is opinionated and turgidly written,[42] Tout nevertheless concedes that it is valuable "as a record of facts."[43] The chronicle shows great interest in meteorological and astronomical phenomena (the two interests are one, since weather and the planets are very much related in the fourteenth-century mind).[44] Reading records, among other things, the freezing over of the Thames in the winter of 1309/10[45] and provides an eerily vivid description of the thirteen-day comet of Christmas 1315 which, he says,

"foretold the subsequent evils."[46] His descriptions do, at times, strain one's credulity, as in the case of his long recounting of a mysterious aerial phenomenon which was seen near Uxbridge on the evening of 4 November 1322,[47] but his interest in unusual natural events does make him a valuable source for this study.

Relevant to the question of the Agrarian Crisis is his description of the cold and the wetness which began the famine. It occurs *sub anno* 1314, immediately following his account of the Battle of Bannockburn:

> In the realm of England there were floods and inundations of rain, with an unusual intemperateness of the air, consuming the fruits and victuals. For in one year not seven days of fair weather could be found together. Such a dearth of foodstuffs followed these things, and so severe a famine, that the greatest multitude of men died of starvation.[48]

The entries for the years 1315 and 1316 also contain references to the famine. One of these, a reference to conditions on the continent, describes the abortive attack made by the French against the Flemish in which the French armies found themselves sinking in mud caused by the incessant rain.[49] Another refers to the famine as "a sterility of the land and of the sea"[50] and lists the dearth, the famine, and the Scottish raids as "the three cruel destructions" of 1316.[51] In general, Reading's statements on the famine underline two main themes: the great mortality of men that it caused, and the wetness and the flood conditions that prevailed. (Among other things, he tells of the drowning of the Abbot of Abindgon and a number of monks in "a certain river swelling up with the land's overflowings of rains.")[52]

After the famine, Reading also mentions the "invasion" of the 1319 animal mortality into England as his last entry for 1318.[53] When we consider the systems of dating then in use, this would suggest that the mortality began in the first months of 1319. Finally, there is also a reference to food shortage and starvation in the army fighting the Scots in 1322,[54] and a statement that the year "was turning into rain" around November.[55]

Also a continuation of the *Flores Historiarum* are the *Annales Londonienses*, a chronicle covering the years 1194 to 1330. It is an abridgement of the *Flores* until the year 1301, after which it becomes independent. William Stubbs, who edited the only printed edition of it, in 1882, pointed out that "from the year 1301 to the year 1316, whether they be the work of one writer or two, the annals contain a relation, which is simply invaluable, of the closing events of one reign and of the early troubles of the next."[56] After this point there is nothing until the year 1329. For both 1329 and 1330, however, it is full and detailed.

The earliest known manuscript of the *Annales Londonienses* is written in hands of the first half of the fourteenth century.[57] Beyond that, it is impossible to date precisely its writing. Its fullness from 1301 to 1316, and its apparent closeness to the events, would lead one to suspect that it was mainly composed during those years and that the subsequent materials were added at a later date. It might just as well be, however, that it was written as late as 1330, and that the chronicler relied on a good set of notes for the years 1301 to 1316, or even on a good memory.

The chronicle was named *Annales Londonienses* by William Stubbs,[58] who published it under that title because of its obvious London provenance. Nothing other than his London association, however, is known about the author. Stubbs does surmise, nevertheless, that the author may be indentified with a certain London fishmonger by the name of Andrew Horn on the basis of the close similarity between the selection of documents in the *Annales Londonienses* and that in Horn's *Liber Custumarum* and *Liber Horn*, and for other reasons.[59] This identification remains in the realm of pure speculation, however, in spite of its ingeniousness.

As a source for the Agrarian Crisis, or at least for its beginnings, it is a fairly good account, although not as informative as Robert of Reading's. And while it is a national chronicle as far as political events are concerned, it is almost exclusively a London chronicle in its accounts of natural phenomena. Furthermore, the unusual events of weather, and of nature in general, are a relatively minor concern in the context of the whole chronicle.

Still, there are some interesting passages along these lines. The description of the cold spell of 1309/10 that froze the River Thames is quite long and detailed, and it adds the information that the pressure of the frozen river caused bridges to collapse and even threatened London Bridge.[60] And there is also a curious passage, perhaps significant,[61] which records the visit of an eighty-foot whale to the waters near London in February 1309.[62] The first mention of the famine itself, however, occurs *sub anno* 1315 in these words:

> In the same year there was a very great famine and pestilence everywhere in England, so that there were not enough living to bury the dead; and it lasted in this way through three years, almost continuously, so that a quarter of wheat was sold for 20 shillings, 30 shillings, and sometimes for 40 shillings.[63]

The special interest of this passage is that it is one of the first descriptions of the famine which attributes its very high mortality to a concomitant epidemic disease. Unfortunately, it does not elaborate, and it is also a little disappointing in that it uses a rather tired cliché in describing the extent of the mortality. The phrase "not enough living to bury the dead" goes back at least as far as St. Bede.[64] Still, the extent of the famine is here measured in real terms, that is, in its effect on wheat prices. In England at the time, bread was made almost exclusively from wheat, making the wheat price there a better index of famine than in other European countries. Normally, wheat sold at between five and six shillings a quarter and it was rare that the price even doubled.[65] The fourfold to tenfold inflation described in the above passage would therefore mean complete harvest failure in those three years.

There is another short description of the famine in the *Annales Londonienses* under the year 1316. It states that the price of salt rose to forty shillings for eight bushels.[66] The price of salt appears to be a sensitive meteorological indication as well since salt was produced by evaporation, mostly solar evaporation.[67] Apparently, there was very little sunshine in 1316, and one can be sure that there was also a shortage of dry turf, which was used as a fuel in drying out salt.[68]

The chronicler states further that there was "*intemperies permaxima*" (exceedingly inclement weather) in 1316.[69] This may be just a way of describing the endless rain, although there is in the word *intemperies* a hint of both cold and storminess.

The main characteristic of the *Annales Londonienses* as a chronicle is its extensive use of letters, statutes, and legal documents, which it invariably quotes in full. These, too, tell a little of the story of the famine. Before the chronicle even mentions the famine it gives a full transcription of the king's ordinance of March 1315 fixing meat prices, or more precisely, the prices of all edible animals.[70] This ordinance was ineffective and was revoked the following year, but it indicates that price of food must have been high even before 1314, although the chronicle makes no mention of it. Why the meat prices were already high at that time is an open question.

Other relevant documents quoted in the *Annales Londonienses* include the edict revoking the price-fixing statute,[71] an ordinance of August 1316 against extravagance in housekeeping,[72] and an ordinance of January 1317 fixing the price of beer in order to make it unprofitable to convert the scarce grain into malt.[73]

Also a good source--indeed, an excellent one--is the *Vita Edwardi Secundi*, which ranks as one of the best chronicles of the century. The only real criticism that can be levelled against it as a source is that it is somewhat given to polemicizing. It is believed to have been written in 1325-1326,[74] a belief that is based on its internal unity. It reads like a true biography and is without the disjointed format of the traditional chronicle; this argues for its

having been written "all at once," so to speak, rather than in bits and pieces over several years, since it gives the appearance of having been done so. Furthermore, William Stubbs points out that it gets much fuller towards the end,[75] that is, towards 1325 (it does not complete the reign for some unstated reason[76]). This may be taken to suggest that it was written around 1325 or shortly thereafter and that the annals increased in length the nearer they approached the time of writing, or the time of the chronicler's recent memory. Nevertheless, it is still possible that it was written over a prolonged period, and one cannot be certain that it was not being written during the crisis years themselves.[77] In the same way, one cannot be certain that it was not written entirely at a later date than 1326.

The chronicle itself survives in only one manuscript, a 1729 transcript by Thomas Hearne of a fourteenth-century manuscript which is believed to have been destroyed by fire in 1737. The part covering the period from March 1322 to November 1324 was missing in the original manuscript. And, according to its translator, N. Denholm-Young, the chronicle was still in the rough state and "had never undergone an author's final revision."[78]

Still, it is an extremely valuable document, in spite of all these uncertainties, for it is "nowhere dependent upon any extant historical narrative."[79] And while it is not known who the author was,[80] it is surmised that he was a "West Countryman,"[81] well-versed in civil law,[82] and an "exceedingly well-informed person."[83]

It is not to be expected, however, that the chronicler would be any better informed than any other chronicler on such matters as the

weather and the price of wheat, but he nevertheless has much to say on these matters and his general intelligence and probable nearness to the events gives value to the observations that he makes. The chronicle is informative, for our purposes, particularly on the famine itself, but no mention is made of the animal mortality of 1319, nor of any agrarian problems after that date. The first reference to the famine occurs amidst his descriptions of events that occurred in 1315, immediately following his notice of the death of the Earl of Warwick, who died August 12 of that year:

> By certain other portents the hand of God seems to be raised against us. For in that past year there was such plentiful rain that men could scarcely harvest the corn or bring it safely to the barn. In the present year worse has happened. For the floods of rain have rotted almost all the seed . . . and in many places the hay lay so long under the water that it could neither be mown nor gathered. Sheep generally died and other animals were killed by a sudden plague.[84]

It is clear that the miserable harvest referred to in this quotation is that of 1314, suggesting once again that the famine conditions had already begun by 1315. This is further borne out by the chronicler's description of the March 1315 parliament. Besides the price-fixing ordinance, he also mentions the efforts of those assembled to "cut government expenses," as it were, by removing excess members of the king's household and by cutting back on its daily expenditures.[85] At that date they could not be anticipating the problems of 1315 unless they had already had a taste of them in the preceding year, or years.

The above passage also adds to the picture of the famine by pointing out that epidemic disease raged among the livestock, especially the sheep. There is the possibility that this may be a misplacement

of the 1319 animal mortality, although it is much more likely that it is an accurate statement, since a number of sheep diseases, specifically foot rot, liver fluke disease, and Black's disease, are especially favoured by wet conditions.[86] The author of the *Vita Edwardi Secundi*, however, makes no mention of an epidemic among humans until the following year, when there "came a severe pestilence, of which many thousands died in different places."[87] At the same time, he also refers to the famine as the worst in a hundred years,[88] and says that wheat sold for forty shillings a quarter around London[89] while people in Northumbria were eating dogs and horses "and other unclean things."[90] Nothing further is said of the famine, except to state that it ended in 1318.[91]

The next chronicle to be considered is the *Polychronicon* of Ranulf Higden. While the *Flores Historiarum*, the *Annales Londonienses*, and the *Vita Edwardi Secundi* can be said to be full in their treatment of the crisis, this can certainly not be said of the *Polychronicon* which contains only two short statements dealing with the famine. But the treatment of Edward II's reign as a whole is brief and summary and as a result the famine still emerges as a very important event in Edward's reign. In a sense the *Polychronicon* should also be ranked among those chronicles that deal with the more distant past rather than with their own time, for it includes its own age rather as an afterthought at the end of a long and exhaustive world history. In fact, it is arranged into seven books, and only the last part of the seventh book is contemporary.

It is considered to have been written in the 1320s,[92] and the first version of it ended with the year 1327. Shortly after that time

many copies were already in circulation. Since the part dealing with the reign of Edward II was assuredly written last, and indeed it treats the whole reign as a completed event, generalizing on Edward's failures and accomplishments, we can say that the contemporary part was definitely written no earlier than 1327, and certainly not much later.

Ranulf Higden was a monk of the Benedictine Abbey of St. Werburgh at Chester, an abbey that may well be described as a literary centre at this time. Like Trevet, Higden was a scholar who wrote other things besides historical works. He is the author of the *Ars Componendi Sermones* and the *Speculum Curatorum*, as well as other later works; however, it is the *Polychronicon* which did most to establish his reputation.

The *Polychronicon* is not written in the annal format but is divided into chapters. One of his references to the famine can be said to refer to "some time around 1316," and states simply that there was a pestilence among animals and men, heavy summer and fall rains, and a dearth that brought the wheat price up to 40 shillings a quarter.[93] Of far more interest is the other mention of the famine which occurs in the short half-page summary of Edward II's reign with which Higden introduces his account of that reign. After describing Edward's appearance and personality, he summarizes the important developments of his reign, which begins as follows:

> There was in his days such a dearth of wheat and so great a continuous mortality of animals existed as had scarcely ever been seen in the centuries preceding. Then there were continuous tithes, incessant contributions, and unremitting plunderings of temporalities and spiritualities.[94]

Here, then, is something rare--a chronicler, or any historian, medieval or modern for that matter, giving the dearth pride of place among the

serious difficulties of Edward II's reign. Also, in reading the above quotation, one wonders whether Higden intends that the reader make a causal connection between the dearth and the numerous exactions that he lists immediately afterwards. The juxtaposition certainly gives one that feeling. In this way, while Higden does not actually tell us anything new about the famine, he still manages to emphasize its importance.

There is one other chronicle that ought to be mentioned at this point, either as the last chronicle of the first group or as the first chronicle of the next, for it could equally well belong to either. This is the *Nicholai Triveti Annalium Continuatio*, which covers the period 1307 to 1318. It is not known who wrote the chronicle, or when, and its inclusion among the chronicles written before 1330 is mere guesswork. The guess, however, is based on the fact that since it deals exclusively with the reign of Edward II, and since it is by tradition a continuation of Trevet's *Annales* which were written around 1320, it was most probably written in the decade 1320 to 1330 when most chronicles focussing primarily on Edward II were written, and when one might almost say it was "fashionable" to write continuations for chronicles that had ended with the year 1307.[95]

There has only been one printed edition of the *Nicholai Triveti Annalium Continuatio* and that was in 1722. Since then it has been mostly ignored; historians have generally not considered it to be an important source, and there has been little mention of it in the secondary literature. For our purposes, however, it is unique. No chronicle devotes proportionately as much space to "environmental

events" and there is much mention of rains, floods, violent storms, and their consequences. There is also a great deal of attention given to astronomical occurrences, such as eclipses, indicating again that in the fourteenth-century astronomical and meteorological events were very much part of a single whole.

The emphasis on violent lightning storms is the most singular aspect of this chronicle, and a number of them, especially winter lightning storms, are vividly described.[96] Furthermore, the storminess is here shown to be characteristic of the famine weather, which was more dramatic than just steady rain for endless grey days. Of the year 1316, the chronicler says that it was worse than the preceding year and that "it continued so in rains and lightnings and tempests, that the earth could not give its fruits, however much it had been well seeded, on account of the excess of water, especially in the bottom soil, as in the valleys and marshes."[97]

Another unique entry in this chronicle appears under the year 1310 and states that in that year "there was such a scarcity of wheat, and such a dearth of oats in the summer, that a *summa* of grain was sold for twelve shillings, and a *summa* of oats for 4 shillings 8 pence."[98] Here, for the first time perhaps, is a concrete statement that agrarian problems preceded "the famine proper." The chronicler does not tie this scarcity in with the weather, but it would not be unreasonable to speculate that the abnormal weather conditions which froze the Thames over the previous winter may have been preceded by equally abnormal weather conditions in the summer and autumn of 1309, damaging the crops. In any case, the chronicler does report an

unusually severe storm on September 3 (in which a church in Dorsetshire was struck by lightning and burned down),[99] and high winds the preceding day had levelled trees in some areas.[100]

The next famine year, according to this chronicler, was 1315:

> The year was truly rainy, in the summer as well as in the winter, so that, to be precise, all the hay and grains in the bottoms or low-lying lands, or in the meadows, throughout the valleys and marshes existing anywhere throughout the whole land, were for the most part lost, and in like manner submerged; on account of which a mortality of men and other animals, a dearth of grains, an immeasurable lack of salt, and a scarcity of victuals followed; and a bushel of salt was commonly sold for two shillings and sixpence, which had not been heard of in our time.[101]

The chronicler returns to the topic of the famine once again in his treatment of 1316. In describing the king's stay at Lincoln in January he again shows his caution and "un-medieval" concern for accuracy in his remark that "it was popularly said that there the scarcity and dearth of grain was such that a quarter of wheat sold for twenty shillings."[102] A little further on he states, with greater assurance, that the price of wheat that year was commonly twenty shillings a quarter.[103] Of interest too, is the fact that he also talks of livestock pestilence in 1316, but unlike the author of the *Vita Edwardi Secundi*, he emphasizes cattle deaths and makes no mention of sheep.[104]

This, then, is the extent of the treatment of the Agrarian Crisis in the *Nicholai Triveti Annalium Continuatio*, except for one further remark under the year 1318 to the effect that the famine ended that year. The description of the year 1318 also contains another interesting and surprising statement. Although it has no direct relevance to

the Agrarian Crisis, it might still be called a "natural phenomenon" of a kind. He states that England experienced an earthquake at dawn on the fourteenth of November of that year. The temptation to begin to question the credibility of this otherwise credible chronicler would be particularly strong at this point but for the fact that his statement is corroborated by a number of other chroniclers, among them John Trokelowe, Thomas Walsingham and the author of *The Louth Park Chronicle*.[105] And the author of *The Lanercost Chronicle* specifies that that day was a Tuesday.

Looking back at the foregoing chronicle accounts of the crisis years, one can perceive a fairly consistent picture emerging. While every one of the chronicles has gaps in the story that have to be filled out by details from the other chronicles, there are few instances in which the information presented is obviously contradictory. The assembled story, then, is one of a famine that becomes catastrophic in the year 1315, but which has already had its way paved by harvest failures in 1309 and 1314. Its cause is rain and cold, primarily rain, and it is accompanied by floods and violent storms, by a plague and by a sheep murrain. Cattle deaths are mentioned for both 1316 and 1319, but on the basis of this information alone it is not clear whether this is a matter of there being two different mortalities, one prolonged one, or merely confusion on the part of the chroniclers. Finally, it is agreed among the chroniclers that the harvest of 1318 was the first normal one after the onset of the famine.

The chronicle picture of the famine is of special interest because chronicle-writing as an activity was undergoing a change, and

different attitudes towards the writing of chronicles were developing during the reign of Edward II. Few chronicles were written during the crisis years, perhaps even none at all, and this may have been due to the hardships. But as Antonia Gransden's work has shown, the intellectual atmosphere is of more importance than physical conditions in explaining the motivations for chronicle-writing. In the period that Gransden was discussing it was primarily political interest in the present that spurred the chroniclers of the latter part of Edward I's reign, but in the first part of the fourteenth-century it was more of an historical interest that prompted the chroniclers. This is shown by the fact that in the time of Edward II chroniclers were writing their works in much shorter periods of time and they were more often retrospective. They were written at times when chroniclers might reasonably have the feeling that an era or a great event had ended, such as after the death of Edward I and again at the end of the Agrarian Crisis. The impulse was renewed again after the end of Edward II's reign, and in all three instances, the chroniclers wrote with a perspective of completion.[106]

In reconstructing any historical event, the chronicle sources have a double value. Besides presenting basic factual material, they also give an impression of how the educated members of society perceived the event and how they evaluated its importance. No medieval source is able to convey the subjective experience from such a perspective of time and space as a chronicle that is attempting to be national in its scope. And in the early part of the fourteenth century there was a greater interest than ever in viewing events in

perspective, for it seems as if the English nation was then looking back on itself with an unusual earnestness--at least it was certainly doing so through its writers.

NOTES TO CHAPTER ONE

[1] For example, Walsingham in his *Chronica Maiora* (*Historia Anglicana*, vol. 1, *Chronica Monasterii S. Albani*, vol. 1, RS, no. 28 [London, 1863], p. 124) begins his account of the year 1310 with the words: "*Anno gratiae millesimo trecentisimo decimo, qui est annus regni Regis Edwardi a conquestu Secundi, quartus. . . .*" This, of course, can lead to a fair amount of confusion since the regnal year and the calendar year can be very different. In the fourteenth century the calendar year began on the Feast of the Annunciation, March 25, and the regnal year began with the date of the accession of the king. During Edward II's reign, then, the regnal year began on July 8, a difference of over three months from the calendar year. There were exceptions to these two systems: the Exchequer used the regnal year for its period of account but dated it from Michaelmas (September 29); many manorial accounts are based on the year *Anno Domini* but date it from Michaelmas to Michaelmas because they are based on the harvest returns which would be in by then (this is what some modern historians refer to as the "harvest year"); and finally, some chroniclers date the calendar year from Michaelmas. These chroniclers include Adam Murimuth, Geoffrey Baker, and, possibly, Walsingham. Walsingham's dates tend to be a year behind, which is typical of chronicles using this system, but I have not been able to ascertain that he is using this system and not simply being careless in his chronology. The problem is further complicated by the fact that if a chronicle is based on Michaelmas as the first day of the year, it is still a question whether the year that it begins is the one that it is in by our reckoning, or the following one. In other words, would 30 September 1315 in our system be 1315 or 1316 in a chronicle that began the year at Michaelmas? Normally it would be 1315 but I am of the opinion that it would still be advisable to check separately each document dealt with to ascertain as far as possible which system it is following. For discussions of the problems of dates see both C.R. Cheney, *Handbook of Dates for Students of English History*, Royal Historical Society Guides and Handbooks no. 4 (London: Royal Historical Society, 1970), pp. 1-13, and J.Z. Titow, *English Rural Society 1200-1350*, Historical Problems: Studies and Documents series, no. 4 (London: George Allen & Unwin, 1969), pp. 27-29.

[2] Antonia Gransden, *Historical Writing in England c. 550-c. 1307* (London: Routledge & Kegan Paul, 1974), p. 443.

[3] Ibid.

[4] Ibid.

[5] A.G. Little, *Franciscan Papers, Lists and Documents* (Manchester University Press, 1943), pp. 43-48.

[6] Edgard B. Graves, *A Bibliography of English History to 1485* (O.U.P., 1975), p. 396.

[7] *Annales Cestrienses; or Chronicle of the Abbey of S. Werburg, at Chester*, ed. and trans. with an intro. by Richard Copley Christie, The Record Society for the Publication of Original Documents Relating to Lancashire and Cheshire, vol. 14 (n.p., 1887).

[8] Graves, *Bibliography*, p. 413.

[9] Graves (*Bibliography*, p. 396) names William Rishanger as the most probable author of this chronicle. However, Henry Thomas Riley, the editor of the only published edition of the *Annales Angliae et Scotiae* argues in his introduction that Rishanger was not the author. See *Willelmi Rishanger, Chronica et Annales, Chronica Monasterii S. Albani*, vol. 2, RS, no. 28 (1865), pp. xxxi-xxxiii.

Also written at this time was, curiously enough, *The Crusade and Death of Richard I* in Anglo-Norman French prose. It was completed about 1300 by an anonymous chronicler. See Graves, *Bibliography*, p. 403.

[10] Riley (*Willelmi Rishanger, Chronica*, p. xxxi) argues this on the basis of the fact that both chroniclers style Edward I as "*Edwardus Tertius*."

[11] Graves, *Bibliography*, p. 440.

[12] Gransden, *Historical Writing*, p. 408n. She points out that "from about 1293 the annals become longer, showing particular interest in Edward I's relations with Wales, Scotland and France and including copies of a number of official documents, letters, etc."

It is also to be noted that between 1293 and 1307 Walter of Coventry wrote a chronicle, mostly a compilation, dealing with the early part of the thirteenth century. See Graves, *Bibliography*, p. 411.

[13] The *Annales Londonienses* skip from 1293 to 1300 without a space. The first paragraph of the 1300 portion begins with the words "*Eodem anno*." The omission, then, may be due merely to inadvertence.

[14] Graves, *Bibliography*, p. 411.

[15] Josiah Cox Russell, *Dictionary of Writers of Thirteenth Century England*, Bulletin of the Institute of Historical Research, Special Supplement no. 3 (London, 1936), p. 89.

[16] Harry Rothwell, ed., in his introduction to *The Chronicle of Walter of Guisborough*, Camden Third Series, vol. 89 (London: Royal Historical Society, 1957), p. xxxi.

[17] Ibid., pp. xxx-xxxi.

[18] Graves, *Bibliography*, p. 421.

[19] William Stubbs, ed., in his introduction to *The Historical Works of Gervase of Canterbury*, vol. 2, RS, no. 73 (London, 1880), pp. xxxiv-xxxvi.

[20] James Westfall Thompson and Bernard J. Holm, *A History of Historical Writing*, vol. 1 (New York: Macmillan, 1942), pp. 390, 405.

[21] The next seventeen years rather than any other number of years are referred to here simply in order to compare the first period with a period of equal length. There is the advantage, however, that the Agrarian Crisis falls nicely within the span of the second period.

[22] Stubbs, *Chronicles of Edward I and Edward II*, vol. 2, p. xiv.

[23] Ibid., p. xiii.

[24] The question of whether it is a case of three Johns or just one is discussed in some detail by Stubbs in *Chronicles of Edward I and Edward II*, vol. 2, pp. xi-xiii.

[25] Riley, *Willelmi Rishanger, Chronica*, p. xxxvi.

[26] *Willelmi Rishanger, Chronica*, p. 411: "*Quoniam sacra Scriptura dicit, --Lauda post mortem, praedica securum, --post obitum Domini Edwardi, illustris Regis Angliae, recapitulando in genere et compendiose concludendo, frater Willelmus de Rissanger, Chronicator, de multis pauca tangendo, ad Dei honorem, et animae regiae recommendationem, redegit in scripturam.*"

[27] Or so it would seem from the note at the foot of the first page of his chronicle: "*Memorandum quod ego, Frater Willelmus de Rishanger, Chronigraphus, die Inventionis Sanctae Crucis Anno Gratiae* $m^{o}ccc^{mo}xii^{o}$, *qui est annus Regis Edwardi, quintus, habui in ordine xli. annos, et in aetate lxii. annos. --Hic est liber Sancti Albani.*" See Riley, *Willelmi Rishanger, Chronica*, p. xii. Riley states that the chronicle is written in a late thirteenth- or early fourteenth-century hand, but as far as the above memorandum is concerned, he only specifies that it is in an "ancient hand."

[28] It should also be pointed out here, in passing, that the so-called *Chronicle of William Rishanger* is now known not to have been written by him, but rather by an unknown chronicler writing after the middle of the fourteenth century (Graves, *Bibliography*, p. 443). It too, however, is an example of the same backwards-looking trend exhibited by Rishanger, for it does not come any further than the year 1306.

[29] Gransden, *Historical Writing*, p. 504.

[30] Ibid., p. 487.

[31] Ibid., p. 502.

[32] Ibid., p. 503.

[33] Ibid., p. 504.

[34] Under this heading the following chronicles will be treated: the Westminster continuation of the *Flores Historiarum*, the *Annales Londonienses*, the *Vita Edwardi Secundi*, the *Polychronicon*, and the *Nicolai Triveti Annalium Continuatio*.

[35] This heading comprises the *Continuatio Chronicarum* of Adam Murimuth, the *Annales Paulini*, the *Annales* of John Trokelowe, the *Chronicle of Lanercost*, and the *Chronicon* of Geoffrey Baker. Mention will also be made of the *Brut* and the *Historia Aurea*, as well as a London chronicle which is essentially a local chronicle but which has some characteristics of a national chronicle, namely the *Croniques de London*.

[36] This third group consists of Sir Thomas Gray's *Scalacronica*, the *Eulogium Historiarum*, the canon of Bridlington's portion of the *Gesta Edwardi de Carnarvan*, and the *Chronica Maiora* of Thomas Walsingham. Mention will also be made of the chronicle by Henry Knighton which has a couple of passages of interest, though not original for Edward II's reign generally.

[37] T.F. Tout in his article "The Westminster Chronicle Attributed to Robert of Reading," *EHR*, vol. 31 (1916), pp. 450-465, argues that it is very unlikely that Robert of Reading wrote this continuation since the only record surviving of a monk of Westminster named "R. de Redinge" dates from 1317 and refers to him as deceased (the records for Westminster Abbey at this time, though not perfect, are nevertheless very good, and therefore there is very little likelihood of there having been two monks of Westminster named "R. de Redinge" at the same time).

On the other hand, Antonia Gransden, in "The Continuations of the *Flores Historiarum* from 1265 to 1327," *Mediaeval Studies*, vol. 36 (1974), pp. 472-492, finds it much easier to accept the medieval tradition that it was written by Robert of Reading than Tout's argument that there is no basis for questioning that it was written by a Westminster monk in the first place.

[38] Gransden, "Continuations," p. 485.

[39] Ibid., p. 476.

[40] Ibid.

[41] Ibid., p. 488.

[42] Tout, "The Westminster Chronicle," pp. 456-457.

[43] Ibid., p. 461.

[44] The integral relationship between meteorology and astronomy in the minds of fourteenth-century English chroniclers is well illustrated by two passages from the chronicles under consideration: in the *Vita Edwardi Secundi*, under the year 1316, the author first speculates that the hardships of the famine might be an extraordinary punishment from God, and then he says: "Yet those who are wise in astrology say that these storms in the heavens have happened naturally; for Saturn, cold and heedless, brings rough weather that is useless to the seed; in the ascendant now for three years he has completed his course, and mild Jupiter duly succeeds him. Under Jupiter these floods of rain will cease, the valleys will grow rich in corn, and the fields be filled with abundance." (*Vita Edwardi Secundi*, ed. and trans. with an intro. by N. Denholm-Young, Nelsons Medieval Texts [London: Thomas Nelson & Sons, 1957], p. 70); and Robert of Reading himself begins his description of the famine with these words:

"During the cyclic revolution of the present year, the flourishing and very learned studies of the Greeks and of Hermonia on the courses of the stars, publicly send their writings through many parts

of the world concerning impending dangers, in which they asserted that the stars have turned their faces from their right paths and confused their usual courses, signs of coming confusions and oppressions of the people, commotions and collisions of the four elements, through which fear and trembling, hunger and pestilence, and horrendous storms would violently attack mortals." (*"Sub orbitali praesentis anni revolutione florentia Graecorum et Hermoniae studia in cursu astrorum peritissima per plurimas orbis partes apices suos super iminentibus periculis publice destinarunt, in quibus asserebant vultus suos a rectis tramitibus avertere sidera et solitos confundere cursus, praesignantes confusiones et pressuras gentium, commotiones et collusiones quatuor elementorum, quibus timor et tremor, fames et pestilentia, tempestatesque horrendae mortalibus ingruerunt periculose."* *Flores*, vol. 3, p. 160.)

Ironically, the attitudes of the experts seem to be coming full circle on this question. The most detailed, comprehensive, and up-to-date study of paleoclimatology, H.H. Lamb's *Climate: Past, Present and Future*, vol. 2 (London: Methuen & Co., 1977) complains (p. 244n) about the kind of narrowmindedness "which leads some meteorologists to insist that the explanation of climatic changes lies within the ocean-atmosphere system and is unlikely to involve solar or cosmic influences outside the Earth. There is a great need for open minds and a careful integration of knowledge." For a similar viewpoint see John Gribbin and Stephen Plagemann, *The Jupiter Effect* (n.p.: The Macmillan Press, 1974; reprint ed., n.p.: Fontana, 1977) and John Gribbin, *The Climatic Threat* (n.p.: Fontana, 1977).

[45] "For on Christmas Day and for some time afterwards, a North wind, a blast descending from above, joined the land together and also the flowing of the waters, especially of the River Thames, into such an icy hardness that they showed themselves to be passable to horses or men, even to burdened draft horses." (*"In festo nempe Nativitatis Dominicae et postea per aliquod tempus ventus Borealis, flatus ex alto deducens, terram necnon aquarum fluenta et maxime Thamensis fluminis sic in glacialem compaginavit duriciem, ut equis hominibusve ac bigis onustis se transmeabilem exhibuerunt."* *Flores*, vol. 3, p. 146.)

[46] Ibid., p. 173.

[47] Ibid., pp. 210-211. A similar, though briefer, description occurs in the *Chronicon Angliae Petriburgense* under the year 1321. It has the variation that the phenomenon--in both chronicles described as a battle in the air--was visible in many different places in England, but "especially above the castle of the Earl of Lancaster." See *Chronicon Angliae Petriburgense*, p. 162. This chronicle is a local chronicle written in the second half of the fourteenth century.

[48] *Flores*, vol. 3, pp. 160-161: "*In regno Anglorum tantae fuerunt alluviones pluviarum et inundationes aquarum cum intemperie aeris insolita, fructus et victualia consumentes, quod nec in uno anno septem dies serenitatis simul possent reperiri. Quas tanta sequebatur caristia victualium et saeva fames quod hominum maxima multitudo inedia moriebatur.*"

[49] Ibid., p. 171.

[50] Ibid., p. 174.

[51] Ibid.,

[52] Ibid., p. 170. Flood drownings were also reported in one of the local chronicles. The chronicler of the Abbey of Durham, Robert de Graystanes, wrote that one night around 15 July 1315 sudden floods tore away houses in the region, drowning men, women and children (*Historiae Dunelmensis*, p. 96).

[53] *Flores*, vol. 3, pp. 186-187: "In the course of this year such an animal pestilence invaded the realm of the English, and furthermore that mortality suddenly laid low an infinite multitude throughout the four corners of the realm, so that, leaving few things for the rich in the various parts, it brought grave damage and dire poverty to the poor." ("*In hujus anni decursu tanta lues animalium regnum invasit Anglorum ac per quatuor angulos regni ipsa mortalitas infinitam multitudinem subito prostravit, ut in diversis partibus pauca relinquens divitibus grave dampnum intulit et pauperibus egestatem.*")

[54] Ibid., p. 210.

[55] Ibid. To fully complete the list of unusual meteorological events, mention should be made of the passage under the year 1323 describing a fierce wind, perhaps a tornado, which tore up trees and created a waterspout. This took place on June 24 near the manor of Cowick while the king and Hugh Despenser the Younger were staying there (pp. 216-217).

[56] Stubbs, *Chronicles of Edward I and Edward II*, vol. 1, p. xix.

[57] Ibid., pp. xii-xiii.

[58] Ibid., p. xxviii.

[59] Ibid., pp. xxiii-xxviii.

[60] Ibid., p. 158.

[61] Although I have no reason to suspect that whale observations are significant, it is nevertheless true that the migration patterns of certain animals, especially birds and fishes, are increasingly being studied for their palaeoclimatological significance. As far as the fourteenth century is concerned, one of the most interesting studies of this kind was Otto Pettersson's analysis of the causes of the movement of the herring fisheries ("The Connection between Hydrographical and Meteorological Phenomena," *The Quarterly Journal of the Royal Meteorological Society*, vol. 38, no. 163 [July 1912], pp. 173-191). For a general discussion of the possibilities of deriving palaeoclimatological information from animal evidence, see Lamb, *Climate: Present, Past and Future*, vol. 2, pp. 234-243.

[62] *Chronicles of Edward I and Edward II*, vol. 1, p. 157. Similarly, the *Annales Paulini* note the capture of an eighty-foot whale at the end of its 1308 entry, and the capture of another eighty-foot whale in January 1327 (*Chronicles of Edward I and Edward II*, vol. 1, pp. 267 and 310 respectively). Even if we allow for possible variations in the lengths of medieval measurements compared to ours, the only possible types of whale that it could have been are the blue whale and the finner whale, which average 80 feet and 70 feet in length. Probably the presence of these whales near London is an indication that the waters of the channel were colder than usual.

[63] *Chronicles of Edward I and Edward II*, vol. 1, p. 236: "*Eodem anno fuit maxima fames et pestilentia in Anglia ubique, ita quod vivi non sufficerent humare mortuos; et sic duravit per tres annos fere continuos, ita quod quarterium frumenti vendebatur pro xx. solidis, xxx. solidis, et aliquando pro xl. solidis.*"

[64] The earliest use of this phrase that I have found is in Bede's *A History of the English Church and People*, trans. with an introduction by Leo Sherley-Price, 2nd ed. revised by R.E. Latham (Harmondsworth, England: Penguin Books, 1968), p. 55. Writing about the Britons just prior to the Angle invasion, Bede writes: "Suddenly a terrible plague struck this corrupt people, and in a short while destroyed so large a number that the living could not bury the dead." Trokelowe, *Annales*, p. 94, also uses this image: "*Tot enim moriuntur egeni quod vix sufficiunt vivi ad sepulturam mortuorum.*" The image also appears in Walsingham, *Historia Anglicana*, vol. 1, p. 147, and in a fifteenth-century chronicle of local history in a passage about the famine (*Annales Monasterii de Bermundeseia*, p. 470).

[65] Rogers, *History of Prices*, vol. 1, p. 218, gives the average price of wheat for the years 1251 to 1400 as 5s. 10 3/4d. a quarter, and defines famine, p. 217, as any time in which the average price of wheat for the year goes above 10s. a quarter.

[66] *Chronicles of Edward I and Edward II*, vol. 1, p. 238. The chronicler says "eight bushels" instead of "a quarter" even though a quarter is eight bushels. Perhaps this reflects an awareness that in some regions, particularly in certain fenland areas, salt was sold in nine-bushel measures (H.C. Darby, *The Medieval Fenland* [C.U.P., 1940; reprint ed., Newton Abbot, England: David & Charles, 1974], p. 40n.).

[67] Rogers, *History of Prices*, vol. 1, p. 458 states: "In all likelihood the supply was all but universally, if not wholly, procured from the evaporation of sea-water, in shallow pans or frames, laid on the coast and exposed to the summer sun. . . . So great an influence was excercised, I am persuaded by the amount of natural heat available for the evaporation of brine, that among other facts I should be disposed to take the rise and fall in the price of salt as being more significant of what was the general character of the year, and of the dryness or wet of the summer months, than any other contributory to the elements of such an enquiry." However, damage to the pans by sea floods may also have been a factor during this period.

[68] Darby, *Fenland*, p. 40.

[69] *Chronicles of Edward I and Edward II*, vol. 1, p. 238.

[70] Ibid., p. 234.

[71] Ibid., pp. 237-238.

[72] Ibid., pp. 238-239.

[73] Ibid., pp. 240-241.

[74] Graves, *Bibliography*, p. 449.

[75] Stubbs, *Chronicles of Edward I and Edward II*, vol. 2, p. xliv.

[76] Denholm-Young, *Vita*, p. xviii, hypothesizes that the author's failure to complete the biography was due to his dying prior to Edward II's overthrow.

[77] Such a conclusion would indeed seem to be supported by the fact that the chronicle is written in the historical present throughout, and that many times the author expresses uncertainty about the immediate future, about the results of an event, things he would know if he were writing at a later date. This, however, has been generally regarded as an affectation, or a literary device, on his part.

[78] Denholm-Young, *Vita*, p. xvi. See also p. xviii.

[79] Ibid., p. xiv.

[80] Denholm-Young makes an impressive case for identifying the author with the Herefordshire lawyer, John Walwayn (*Vita*, pp. xxiv-xxviii). It is, however, by no means conclusive.

[81] Ibid., pp. xxii-xxiii.

[82] Ibid., pp. xix, xxi.

[83] Ibid., p. ix.

[84] Ibid., p. 64.

[85] Ibid., p. 59.

[86] It can be considered practically certain that foot rot was present during the famine. The disease would always have been present among the flocks to a limited extent and the wet conditions assuredly encouraged its rapid spread at this time. It is rarely fatal now, although it can be, but it probably was fatal considerably more often in the Middle Ages. Liver fluke can cause devastating destruction among sheep, and the survivors among the sheep usually have liver damage which makes them more susceptible to black disease. The eggs of liver fluke hatch in water and there would therefore be a sharp increase of the incidence of this parasite when the pastures are generally wet. Black disease, or "infectious necrotic hepatitis" occurs in epidemics and involves high mortality. Affecting sheep and in rare instances cattle, it is spread by the animals eating infected herbage. See *The Merck Veterinary Manual*, 4th ed., ed. by O.H. Siegmund and C.M. Fraser (Rahway, New Jersey: Merck & Co., 1973), pp. 337, 701-706, 924-928, and *Hagan's Infectious Diseases of Domestic Animals*, 5th ed., ed. by Dorsey William Bruner and James Howard Gillespie (Ithaca, New York: Comstock Publishing Associates, 1966), pp. 385-396.

[87] *Vita*, p. 70.

[88] Ibid., p. 69.

[89] Ibid.

[90] Ibid., p. 70.

[91] Ibid., p. 90.

[92] John Taylor, *The Universal Chronicle of Ranulf Higden* (Oxford: The Clarendon Press, 1966), p. 33.

[93] Ranulf Higden, *Polychronicon Ranulphi Higden Monachi Cestrensis*, vol. 8, ed. with an intro. by Joseph Rawson Lumby, RS, no. 41 (London, 1882), p. 308.

[94] Higden, *Polychronicon*, vol. 8, p. 300: "*Tanta etiam in diebus ejus caristia tritici tamque continua mortalitas armenti extitit, quanta a retro saeculis visa vix fuerit. Tunc decimationes juges, assidue contributiones, temporalium et spiritualium continue expilationes.*"

[95] Thomas Hog, in his introduction to *F. Nicholai Triveti, de Ordine Frat. Praedicatorum, Annales* (London: English Historical Society, 1894), p. xxiii, points out that the *Continuation of Trevet* is sometimes considered to be a continuation of Matthew Paris, a statement which presumably means that it is a continuation of one of the Matthew Paris continuations, that is, the oft-continued *Flores Historiarum*.

[96] The first began on the evening of 1 January 1308 and lasted through the night (*Triveti Continuatio*, p. 3); the second was on the evening of 27 October the same year (p. 7); and the third storm described in detail began on the evening of 2 September 1309 and again it was a storm that lasted through the night (p. 7).

[97] Ibid., p. 18. The quotation in its context is as follows: "*Annus iste praecedenti miserabilior omnibus bonis vacuatus, & ineffabili miseria repletus sic continuatur in pluviis fulminibus & tempestatibus, quod terra prae aquarum nimietate, quantumcunque bene seminata, fructum suum dare non potuit, maxime in imo solo ut in vallibus & mariscis.*"

[98] Ibid., p. 8: "*Tanta erat parcitas frumenti, tantaque caristia avenarum in aestate, quod summa frumenti pro XIII solidis, summa avenarum pro IV solidis VIII denariis vendebatur.*" A *summa* was the equivalent of a quarter.

[99] Ibid., p. 7.

[100] Ibid.

[101] Ibid., pp. 16-17. "*Annus extitit valde pluviosus tam in aestate quam in hieme, ita videlicet quod omnia foena & blada in profundis sive bassis terris, vel pratis, per totum regnum undecunque existentia per valles & mariscos, perdita fuerunt pro majori parte*

pariter & submersa; ob quod mortalitas hominum ceterorumque animalium, bladi caristia, salis defectus immensus, & parcitas victualium fuit subsecuta, & vendebatur bucellis salis communiter pro II solidis & VI denariis, quod nostris temporibus fuerat inauditum."

[102] Ibid., p. 17. The quotation in its context is as follows: *"Rex quoque tenuit tractatum suum ibiden, & dicebatur vulgo quod tanta fuit ibi bladi parcitas & caristia, quod quarterium frumenti vendebatur pro XL solidis sterlingorum, unde pauperes penitus pro defectu victus moriebantur."*

[103] Ibid., p. 18.

[104] Ibid.: "And that the human race might be even more fully vexed, the oxen were dying to the extent that in the course of the year there was scarcely seen one plough team of strong oxen, especially in the low-lying lands, by which the ground could be turned." (*"Et ut uberius genus humanum vexaretur, boves sic moriebantur, quod vix videretur in profundis maxime terris una Carucata boum fortium processu anni que terra posset verti."*)

[105] Ibid., p. 28. Trokelowe, *Annales*, p. 102, gives the same date and adds that it terrified many. Walsingham, *Historia Anglicana*, vol. 1, p. 154, also gives the same date but goes further and says that it caused a "string of deaths." See also "Chronicle of Lanercost," (trans. by Herbert Maxwell, *SHR*, vol. 9), p. 28, and *The Chronicle of Louth Park Abbey*, ed, by Edmund Venables and trans. by A.R. Maddison (Lincolnshire Record Society, 1891), p. xvii and p. 26.

[106] In the interests of completeness, mention should also be made of a short chronicle written "in or about the year 1327" which deals entirely with Edward II's conflict with his barons. No mention is made of the famine or any agrarian problems. It was published by George L. Haskins in an article entitled "A Chronicle of the Civil Wars of Edward II" (*Speculum*, vol. 14 [1939]), pp. 73-81. No information is given about the chronicle's provenance or its author.

At this time, too, was written the *Chronicum Britannicum Versibus Anglicis Conscriptum ab Antiquissimis Temporibus usque ad Edwardum II. Inclusum.* It was completed around 1327 by Thomas Castleford, a monk of Pontefract. The part covering Edward II's reign has never been printed, however, and it was not consulted for this study. See Graves, *Bibliography*, p. 409.

CHAPTER TWO

Later Chronicle Accounts of the Crisis Years

Some of the chronicles written after 1330 were written by chroniclers who may well be presumed to have lived through the Agrarian Crisis. First in the list of these is the *Continuatio Chronicorum* of Adam Murimuth, which, strictly speaking, might be counted as part of the first group discussed because Murimuth began it as early as 1325,[1] although the bulk of it was written after 1330. It covers the period from 1303 to 1347, the year of Murimuth's death, and it is much fuller towards the end. It is, however, an unusual chronicle in that it conforms to the "classical ideal" of a chronicle; the material contained under its carefully separated yearly entries actually was written piecemeal over an extended period of time.

Relatively much is known about Adam Murimuth. He was born in Oxfordshire at some time between Michaelmas 1274 and Michaelmas 1275.[2] Educated at Oxford, he was a Doctor of Civil Law, and during his life he spent much of his time at the papal court at Avignon expediting both legal and diplomatic matters on behalf of the king and others. The first record of his being at Avignon is from 1311, when he was proctor for the University of Oxford in a legal suit. From the year 1325 on, however, he was a canon of St. Paul's Cathedral in London.[3]

When the incessant rains began in 1314, Adam Murimuth must have been thirty-nine years old, and had long been of sufficient age to be

able to weigh the importance of facts. He himself says he reached that age in 1305, or when he was about thirty.[4] At this time he was actively taking notes which would later form the basis of his chronicle.[5] Hence, if we are in fact dealing with the worst famine "in a hundred years" and with a mortality so great that "the living did not suffice to bury the dead," it is certainly to be expected that Murimuth would be able to provide a full and valuable account of these events. This makes it the more disappointing, and surprising, that the only notice that he gives of the famine is under the year 1315 (probably 1316 by our reckoning in this case, since Murimuth dates the year from Michaelmas) in which he says: "Also, this year there was a great mortality and sterility in England, so that a quarter of wheat was worth 30 shillings and more."[6]

It might be argued that since Murimuth was an urbane and cosmopolitan individual he would not be interested in the more rural concerns, such as the quirks of meteorology and the price of grain, and would be far more interested in the world of litigation or international diplomacy. However, the later parts of Murimuth's chronicle belie such a conclusion, since he is unusually full, for example, in his treatment of the floods of 1334[7] and the extreme cold of the winter of 1338/39 with its subsequent effects on grain prices.[8]

Murimuth is a reliable chronicler and consequently his inattention to the famine and the mortality of the crisis years might well lead us to suspect the other chronicle accounts, were it not for the very great probability that he did not have firsthand experience of the worst of it. According to Stubbs, he was at the papal court of

Avignon from some time in 1314 to some time in 1318,[9] and consequently he must have missed the worst of the famine since the Avignon region was much less affected.[10] He returned again to Avignon in 1319, probably during the early summer, and we can only guess whether this was before or after the animal mortality reached its height. When he came back to London is not known, but it is known that he was in London in 1321 and 1322.[11] In 1323 he left England again, first on a diplomatic mission to Sicily and then went back to Avignon.[12] Thus at the most he experienced the immediate after-effects of the famine and animal mortality in England. He may have witnessed rather severe times in 1320 and 1321, for, according to Ian Kershaw in his recent study of the matter, animals were still dying in large numbers in these years;[13] however, the worst of the mortality occurred in 1319.

Another London chronicle written at about the same time, and possibly even by the same author, is the *Annales Paulini*, which is an abbreviation of the *Flores Historiarum* to 1307 and original from 1307-1341. Stubbs, who edited the only printed edition of it,[14] considered it the work of a single author, and speculated that this author was a canon at St. Paul's, not inconceivably Adam Murimuth himself.[15] H.G. Richardson, however, in an article on these annals, argued that they were the work of not one, but four chroniclers, and that the similarities with Murimuth's work are merely the result of borrowings from the 1337 version of the *Continuatio Chronicarum*.[16]

Despite all this speculation, however, all that can be said with conviction is that the chronicler, or chroniclers, wrote from a London perspective. Nevertheless, in this writer's opinion at least, it is

more reasonable to speak only of a single chronicler, than of four. The evidence to the contrary is tenuous at best.

Dating the *Annales Paulini* is a problem even with one writer, let alone with four contributions to assess. Stubbs limits himself to the statement that it is written in a "somewhat antiquated or artificial hand of the first half of the fourteenth century"[17] and Richardson is no more specific than to say that the first part "was certainly written well after the events recorded."[18] The safest conclusion, it seems, especially in the light of the borrowings from Murimuth, would be that it was written shortly after 1337.

As a source for the Agrarian Crisis it is good, but by no means exceptional. Its interest in meteorological events and natural phenomena shows great similarity with that of the *Annales Londonienses*, but there is not the similarity of wording that would suggest that the latter was used as a source. If anything, the chronicle seems to have an emphasis on cold: the winter of 1309/10 is given full notice,[19] and the cold experienced in France in December 1325 when the Rhone froze is also described.[20] As far as the famine is concerned, however, the descriptions are fairly brief. It is mentioned under the years 1315 and 1316, and like the author of the continuation of Trevet's chronicle, it specifies that it was the poor that died.[21] The chronicle also adds a few new details, such as the fact that because of the famine barefooted processions were held in London on Fridays in 1315.[22] There is also a mention of a terrific lightning storm on July the first, of that year,[23] which again emphasizes for us that storminess was characteristic of those years. The chronicle also states that a quarter of

wheat sold for thirty shillings, and a bushel of salt for five.[24] The price of salt works out to be the same as that given in the *Annales Londonienses* and double that given by Trevet's continuator, an outrageous price either way.[25]

Of the 1319 mortality there is no mention. After the famine the next reference to any agrarian hardship is under the year 1325 in which year, according to the chronicle, there was a severe water shortage for most of the year.[26]

However, if the *Annales Paulini* have their limitations, the next source to be considered is exceptionally full and complete. This is the *Annales* of John Trokelowe, a chronicle covering the years 1307-1323, and written, at least in part, after 1330.[27] When it was begun is not known, but its editor, Henry Thomas Riley, argues that it was compiled during the reign of Edward III, but based on a mass of contemporary notes.[28] We may, however, assume that its writer lived through the events described, at least as a child. And that is the extent of our biographical knowledge of the author.

In any case, it is certainly the most detailed source for the Agrarian Crisis, and as a result it has formed the basis of most modern accounts of the famine, almost to the exclusion of other sources. Indeed, as an authority for the period as a whole, not just its agrarian aspects, it is very valuable, "although somewhat inflated in style and deficient in chronological arrangement."[29] Its provenance, as in the case of a good many chronicles of this period, is the London region, since it is presumed to have been written at St. Albans Abbey, about fifteen miles from London.

There is no mention of famine before 1315, and the first indication Trokelowe gives that things were not as they should be is in his account of the March 1315 parliament and its price-fixing ordinance, which he, too, quotes in full.[30] Trokelowe adds the detail that shortly after its promulgation "a weighty penalty had been inflicted on the poulterers and other retailers in London and other places, who were not observing the provision."[31]

Then Trokelowe introduces the famine by saying that it *increased* in 1315, as if England "had not pleased God in the above-mentioned Statutes."[32] Hence there is an implication that there was already famine in the previous year, as the statutes, of course, imply. Indeed, the king's letter containing the ordinance practically says as much, for it states that "there is a great and almost intolerable dearth these days" of livestock and poultry.[33] Two paragraphs after his statement that the famine had increased, however, Trokelowe writes: "Indeed, the said dearth began in the month of May in the one-thousand-three-hundred-and-fifteenth year of the Lord, and lasted until the feast of the Birth of Blessed Mary. . . . Around the end of autumn this dearth was mitigated in part, but around the Feast of the Nativity of the Lord it returned completely."[34] So, while it is hard to know from Trokelowe how things were in 1314 and, consequently, when exactly the famine began, it seems quite likely from his account that while things were very bad in 1314, it was not until 1315 that the real full-blown famine had descended upon England. Nevertheless it is only when compared with a year as bad as 1315 that 1314 comes out favourably, and from Trokelowe's chronicle one might well argue that, by normal standards, 1314 might well be considered a famine year as well.

Trokelowe's account has many interesting and unique features. When he describes the great price rises in grains, vegetables, and salt,[35] he does not do so also for meat, but emphasizes, on the other hand, its scarcity, suggesting that it had been almost completely removed from the market as a result of the March 1315 ordinance.[36] He states further that the sheep were disappearing from the market in 1315 because of a murrain,[37] placing it a year earlier than chroniclers had hitherto suggested. The chronicle also points out that the rich were badly affected as well as the poor, being forced to dismiss many of their staff and to discontinue almsgiving.[38] Trokelowe even tells of a time when the king's personal household went without food: on an occasion when the king stopped overnight at St. Albans it was not possible to find food for all of his household.[39] The rich did, of course, suffer least, and Trokelowe caustically remarks that "it is not to be doubted but that the poor were wasting away from hunger and starvation if the rich were consistently hungry after their costly meals."[40]

And the poor were certainly dying. Trokelowe describes seeing people dead of starvation lying along the roadside in 1315.[41] And a little further on, concerning the year 1316, he writes:

> With that famine oppressing the whole land in this way, therefore, a mortality of men followed closely. For so many destitute died that the living scarcely sufficed for burying the dead. Indeed, dysenteric disease, gotten from rotten food, polluted almost everyone; a sharp fever followed it, or a goitrous contagion.
>
> And just as men succumbed, poisoned from the corruption of their food, so the beasts and the cattle, infected from the putrefaction of the grass, collapsed with murrain; and no one remembered having seen such dearth and famine before, nor had such a mortality followed. The prudence

> of physicians could not find something suitable as a cure in their art against these diseases, as it used to be able to in old times. For medicinal herbs which used to confer relief to the sick in time of mortality degenerated against their nature and gave poison instead of efficacy because of the intemperateness of the air and the inordinate collision of the elements.[42]

The worthlessness of plants during the famine years seems to be an important theme for Trokelowe; perhaps it is an attempt to find a unifying explanation for much of what happened. Just as he attributes the murrain to something in the quality of the grass and the deadliness of the pestilence to the failure of the herbs, he emphasizes also the uselessness of the grain.

> The bread did not have nutritive strength, or substantial worth in itself in the customary way, for the reason that the grains did not have nutrument from the heat of the summer sun. On account of this, those eating it remained hungry after a short time had elapsed, even if they accordingly consumed a great quantity.[43]

Trokelowe also states that the harvest was so soggy that the grain had to be dried in ovens before it could be baked into bread.[44] And because of their hunger people were willing to eat anything, even their own children in some instances.[45] He also tells of convicts consuming the new inmates cast into prison with them.[46]

This, then, is a summary of the information that Trokelowe provides on the famine years 1314 to 1316. There is no mention of any agrarian problems under the years 1317 or 1318, but under the year 1319 the Agrarian Crisis again comes into focus with the animal mortality of that year. Trokelowe has already spoken of cattle deaths under the year 1315, but it is clear that he regards the *pestis animalium* of 1319 as a distinct event, and he gives it fuller treatment than any previous

chronicler had given any animal murrain during Edward II's reign. The passage describing this mortality has a number of fascinating features which make it worth quoting in full:

> During the course of the same year, as great a pestilential mortality of plough cattle as anyone remembered having seen before prevailed throughout England. In which plague, this astonishing thing happened: the dogs and crows that ate the corpses of the dead cattle, swelled up on the spot, and having been infected, died. As a result, no man presumed to taste bovine meats lest he, too, should succumb poisoned from their diseases. It began, in fact, in Essex at Easter time, and lasted through the whole year. It was even said that all of France was contaminated by the same sickness at the same time.[47]

The above passage concludes Trokelowe's account of the Agrarian Crisis, an account which has been considerably condensed in the foregoing discussion, although its main points have been outlined. There is a further passage, which may be relevant, dealing with starvation in the king's army in the 1322 campaign against the Scots.[48] This cannot be attributed solely to the agrarian problems prevailing throughout England and Scotland for a great deal of it was certainly due to the deliberate destruction of crops in the pursuit of war.

The next chronicle to be considered here, *The Chronicle of Lanercost*, also has a unique and detailed paragraph on the cattle murrain of 1319:

> At the same time the plague and the murrain of cattle which had lasted through the two preceding years in the southern districts, broke out in the northern districts among oxen and cows, which, after a short sickness, generally died; and few animals of that kind were left, so that men had to plough that year with horses. Howbeit, men used to eat cattle dying in the aforesaid manner, and, by God's ordinance, suffered no ill consequences. At the same time sea fishes were found dead on the shores in great multitude, whereof neither man nor other animal nor bird did eat. Also in the southern parts of England the birds

> fought most fiercely among themselves, and were found dead in great numbers; and all these three phenomena seem to have happened either in vengeance upon sinners or as omens of future events.[49]

Although this passage contradicts Trokelowe in some respects--he says the mortality began earlier in the south than Trokelowe says it does and states that one could eat the flesh of the dead cattle without harm--there is agreement on the essential point that there was a special mortality primarily affecting cattle shortly after the end of the famine.

Besides that, however, *The Chronicle of Lanercost* has little of relevance to the Agrarian Crisis. The famine and mortality are dutifully mentioned in a short note under 1316.[50] There is also mention of famine in the army in 1322, in this version accompanied by pestilence,[51] but again there is no real basis for concluding that the war was not the main cause.

It is not known when this part of the Lanercost chronicle was written. The chronicle as we have it today was based on two Franciscan chronicles, and the second of these, the one which concerns us at this point, covers the years from 1298 to 1346. It is simply its date of termination that has led A.G. Little to conclude that it was written about that year.[52]

As to its author, all that is known for certain is that he was a Franciscan. Little attempts to identify him with Friar Thomas of Otterburn, a Franciscan chronicler of the north country mentioned in Sir Thomas Gray's *Scalacronica*,[53] but no definite conclusion can be made. The question is of some importance for this study, however,

since Friar Thomas of Otterburn was granted a licence to hear confessions in the Archdeaconry of Durham in 1343.[54] This would then be the earliest date that we could say definitely that he was in the north. He may have come from there originally, but it is just as likely that he was a southerner sent north in 1343 by his order, and therefore, if he experienced the famine, and more importantly the animal mortality, there is no real reason to suppose that he did so in the north.

Another original chronicle for the reign of Edward II is the chronicle of Geoffrey Baker of Swinbrook.[55] It was written between 1341 and 1359 and has very little to say about the Agrarian Crisis. In fact, all there is in this chronicle is a short paragraph under the year 1315 which mentions famine, pestilence, and the high price of wheat.[56]

It might be tempting to suppose that Geoffrey Baker had not himself lived through the crisis years. However, such a conclusion seems rather improbable in the light of other considerations. The fact that his chronicle shows a particular fascination with the events leading up to the deposition of Edward II and a real antagonism towards Bishop Orleton for his political activities suggests that he probably lived through those times as a politically conscious individual, and therefore, presumably, as an adult. Hence he must have been alive, although perhaps rather young, at the time of the famine. Still, this is guesswork, and all that can be said with certainty about Geoffrey Baker is that he was a cleric living in Osney in Oxfordshire.

This completes the second of the chronicle categories previously outlined. However, mention should be made at this point of a number of chronicles written towards the middle of the fourteenth century which are primarily compilations of existing chronicles but which at the same time contain varying amounts of additional material that is not found elsewhere. Sometimes this material rewards the historians who glean through these chronicles with valuable information, but the work involved is usually daunting, and few of the chronicles have been collated or published, even in part.[57]

This development in the world of chronicle-writing has been recognized by Galbraith as a situation in which "original and contemporary chronicles more and more gave way to second-hand compilations."[58] In the long perspective the interest in universal chronicles and encyclopedic compilations of history is an old one, but in the shorter view it is clear that this interest had a mid-century revival of almost fad-like proportions. Perhaps the backward-looking trend of the chroniclers that wrote during Edward II's reign, a trend which had found its fullest expression in the *Polychronicon*, had come to full fruition. In any case, the compilations of this time were usually vast, and were founded almost exclusively on either the *Polychronicon* or the *Brut*.[59] Today there are hundreds of manuscripts of these two chronicles, some with considerable variations.[60]

Of all of these, only what is called "The Long Version of the Brut"[61] will be considered here. Indeed, some historians are of the opinion that it should be treated as an original chronicle on a level with the best chronicles for the reign of Edward II.[62] The *Brut*

chronicles are generally compilations containing very little variation up until the year 1307, after which they break off into different versions. The earliest of these, written in Anglo-Norman French, appear in two main versions. The Short Version is based on the *Croniques de London*, a London chronicle that appeared about mid-century;[63] the Long Version is much more independent and was popular enough to be translated into English between 1350 and 1380.[64] It is this English translation that has been published in our own time.[65]

The Long Version extended to the year 1333 and was written within a few years of that date.[66] Nothing is known of the author except that which can be inferred from the chronicle itself, and that is that he is a Lancastrian supporter with a northern interest.[67] The chronicle shows no real interest in agrarian problems nor in meteorological happenings, but there is one rather full paragraph which attempts to summarize the crisis, and which, in modernized English, is as follows:

> And at that same time many calamities took place in England; for the poor people died in England from hunger, and so many folks died and so quickly that men could not bury them; for a quarter of wheat was worth 40s., and for two and a half years a quarter of wheat was worth 2 marks, and oftentimes the poor people stole children and ate them, and ate also all the hounds that they could get, and also horses and cats. And after a great pestilence happened among the beasts in various countries of England during King Edward's life.[68]

Although it is somewhat sensationalist in tone, this passage has a certain value in that it, too, presents the animal mortality as a distinct event that followed the famine.

The next chronicle to be considered, the *Scalacronica*, belongs to the third of the chronicle categories previously outlined, that is,

it is one of the chronicles that was written at least thirty years after the Agrarian Crisis and by a chronicler for whom there is no basis for believing that he himself had personal experience of the crisis.

The *Scalacronica* is an unusual chronicle in more ways than one. It was the first chronicle in England to be written by a layman, and it was written in the French language by an English knight held captive in Edinburgh Castle. The chronicler, Sir Thomas Gray, Lord of Heaton Manor in Northumberland, himself explains the circumstances of its composition. Captured in August 1355, he was given the run of the library of Edinburgh Castle during the two years of his captivity. During that time he began to study history and soon started to write a chronicle in fulfilment of a command given him in a dream.[69]

It is very probable that most of it was written during the period of his imprisonment, although some of it was certainly written afterwards, since it comes down to the year 1362. It borrows from Ranulf Higden and others to a great extent, but there is original and useful information in it for the reigns of Edward II and Edward III.[70]

It is not very original or useful when it comes to the Agrarian Crisis, however. It notes the famine in these words: "At which time there appeared the star comet; also it was a dear year for corn, and such scarcity of food that the mother devoured her son, wherefore nearly all the poor folk died."[71] It is not clear what is meant by "at this time" but the context suggests either 1315 or 1316. And other than this vague entry there is nothing.[72]

Written at roughly the same time as the *Scalacronica* is a work commonly known as the *Eulogium Historiarum*. It is a general world history somewhat along the lines of the *Polychronicon* from which it, too, borrows heavily. Its author was a monk of the Abbey of Malmesbury who was probably named Thomas[73] and who probably began writing around 1355, completing his work in 1367.[74] The chronicle deals very sparingly with the reign of Edward II and barely merits mention here in a study of original chronicles of that reign. However, its notices of the famine and mortality, though brief, are peculiar in the extreme and the confusion that they evidence on the part of the author raises many questions; and one may, of course, also wonder how much of this confusion is reflected in modern accounts of the famine and mortality. The *Eulogium* states:

> In the year of the Lord 1319, and in the following year, a great famine took place throughout the whole of England, because food was completely lacking in England and France, and in fact a *summa* of grain was sold for forty shillings.
>
> In the year of the Lord 1321 a mortality of men occurred such as had never been seen before; it is certain that it was in all parts of the regions neighbouring England, and moreover, it is believed to have been throughout the whole world, and to have been greatly due to a lack of food.[75]

To add to the confusion, there is a very short chronicle by the same writer, and composed about the same time as the *Eulogium*. It extends from the Nativity to 1364, and notes only four events from Edward II's reign, one of which is a worldwide famine in the year 1320.[76] The other three events are correctly dated.[77] The later chronicles apparently exhibit something of a trend towards lumping the events together without a real concern for chronology. The account in this particular chronicle, however, may also be indicative of a recollection that the agrarian problems were still very present in 1321.

The next chronicle to be considered here is an exceptional one. Though written late in the reign of Edward III, it has always been held to be an original and extremely valuable source for the reign of Edward II. This is the *Gesta Edwardi de Carnarvan*, with a continuation for the reign of Edward III, written by a canon of the Augustinian priory of Bridlington. It covers the years 1307 to 1339, with a page of notes going on to as late as 1377. The work itself contains irrefutable evidence, such as frequent quotations from the book of the prophecies of St. John of Bridlington, that it could not have been written until 1361 at the earliest,[78] and did not achieve its final form until 1377.[79] Since it was written this late it must have been based on an earlier chronicle, now lost, or on extensive contemporary notes, in order to have achieved "the self-evident contemporaneity and consistency of a great part of its contents."[80]

The canon of Bridlington certainly does not have a great deal to say about the Agrarian Crisis, but what he does say is both unique and interesting, especially when one considers that his is one of the few chronicles that is of northern provenance. Bridlington, in fact, is situated along the North Sea coast roughly twenty-five miles north of Kingston-upon-Hull, and while the region surrounding it, as well as Bridlington itself, was in previous times a fertile source of chronicles, nothing was produced within a hundred-mile radius in the fourteenth century, except for the chronicle under consideration.

For the year 1315, which is the first year that famine is mentioned, the chronicle states that there was great dearth of grain around the Feast of St. Margaret the Virgin (20 July), and again in

the autumn.[81] Then, after listing the prices of various commodities, giving the usual depressing story of sky-high inflation,[82] it adds that

> . . . it is to be remembered that the sterility of the land and the rarity or lack of all produce, and the dearth even of all saleable food, lasted continually through six years, although not at the same price; similarly the mortality of men, and as great a murrain of draught cattle, was so great and continuous, that so much of that kind had not been seen in a century.[83]

The chronicler then goes on to point out that the bodies of the dead were being buried daily, both before and after lunch.[84] After this, the only mention of the famine or of any agrarian problem is a reference to famine in the north of England under the year 1322, and this due to Scottish depradations.[85] It is interesting to note, too, that this entry does not limit the sufferings to the army.

This chronicle, too, blends the famines, pestilences and murrains into a single event, although in this case a prolonged one. Furthermore, as a six-year event it extends through the year 1321, a further indication that that year may have been a rough one.

There remains, now, one more fourteenth-century chronicler to be considered, a chronicler who wrote towards the end of the fourteenth century and considerably later than any of the works discussed so far. This is Thomas Walsingham, the last great St. Albans chronicler, and the author of more contemporary history than any other fourteenth-century English writer.

His writings on the reign of Edward II, however, as in the case of all of his writings on earlier times, are largely compilations from identifiable sources. As such they should not be of any value for this

study, but as it turns out, even the indefatigable Riley, who tracked down most of the chronicler's sources, was unable to find where Walsingham had obtained all of his information on the reign of Edward II. Some information in Walsingham cannot be found elsewhere.

Only two of Walsingham's chronicles cover the reign of Edward II. These are the *Chronica Maiora*, the relevant portions of which have been published in the Rolls Series under the title *Historia Anglicana*, and the *Ypodigma Neustriae*. The second of these, the *Ypodigma Neustriae*, was written in the fifteenth century and is a mere condensation of the *Chronica Maiora* as far as the reign of Edward II is concerned. The *Chronica Maiora*, on the other hand, was written in the early 1390s[86] and has been found by Riley to be based mainly on the *Annales* of John Trokelowe, the chronicle of Henry Blaneforde, and the continuation of Trevet, with short additional passages from Murimuth's chronicle, from Geoffrey Baker's chronicle, and from the *Vita Edwardi Secundi*.[87] The passage whose sources have not been identified are very much in the minority, but they include a series of annual summaries, usually beginning with the words "*Transit annus iste*," which give information on the quality of the harvest and sometimes on unusual meteorological conditions.

The practice of summing up the years in this way is borrowed by Walsingham from Matthew Paris. Although Matthew Paris was not the first to include summaries of this sort,[88] it was his work that influenced Walsingham to do so, and this is yet another indication of Walsingham's determination to carry on the St. Albans tradition of Matthew Paris in his own chronicles. He could not have done so,

however, without having had earlier chronicles or documents to draw from and these would of necessity have had to have been extremely contemporary, since it is difficult to recreate a year's weather conditions from memory after a lapse of even three or four years. From 1259, the year at which Matthew Paris's chronicle ends, to the year 1307, Walsingham's summaries correspond word for word with the annual summaries in the *Chronica Willelmi Rishanger*. (Incidentally, this further corroborates Galbraith's assertion that Walsingham probably worked from this chronicle for the first part of his writings, although Galbraith does not advance this particular piece of evidence.)[89] From 1307 on, however, the source of these summaries is unknown.[90]

The annual summaries are not as full in Walsingham's work as they are in Matthew Paris's chronicle, and for this reason they do not provide as detailed and as conclusive a picture as one might desire. Nevertheless, considering the sparseness of chronicle material on the famine, these annual notes are among the more valuable sources of chronicle information.

In the main body of the *Chronica Maiora* the dates tend to be a year behind, which suggests that Walsingham is dating his year from Michaelmas to Michaelmas, and which also makes it apparent that Walsingham has had to adjust the dates given by his sources. Whether he has had to do the same for the dates of his source for the annual summaries or whether they already followed the "harvest year" is uncertain, but if he has adjusted them it is impossible to know how carefully or successfully it was done. The annual summaries indicate that the two worst years were 1314 and 1315 and that the English

suffered defeat from the Scots in 1313.[91] Since the two worst years were 1315 and 1316 and Bannockburn was in 1314, it seems quite evident that the safest course is to assume that the dates given are a year out. In the discussion that follows, therefore, all the dates have been moved forward one year.[92]

Starting from the year 1300, then, there is no really bad year mentioned until 1310, which is described as a slight year for fruit and produce. 1311 is summarized as a mediocre year for produce[93] and 1312 is characterized as scanty ("*rarus*") in its production of fruit and grain.[94] 1313 is described as not productive enough (*non satis frugifer*)[95] and 1314 is characterized in similar terms.[96] One may easily get the impression from the years cited here that the annual summaries are always complaining, but some years are described in glowing terms, for instance 1309,[97] although mostly the summaries just say that the year in question was neither poor nor abounding. From 1310 until the improved but non-committal 1322 every year is characterized as being below normal.

The entry for 1315 is as follows: "This year passed harshly and cruelly for the English, grinding the English with a double grief, namely famine and a plague which they contracted from the famine."[98] The summary for 1316 also shows the severity of the times, stating that it was productive neither in fruit nor in produce, and remarking on the prevalence of dysentery, acute fevers, starvation and "corrupt air."[99] 1317, a year that chroniclers rarely honoured with a description of its agrarian conditions, is here described as sterile in many parts of the land but having plenty as far as misery is concerned.[100]

And 1318, the year that some chroniclers hailed as the end of the famine, is summarized here as a year in which neither fruit nor produce sufficed.[101] Produce and fruit (*fruges et fructus*) are even scarcer in 1319, the year being characterized as poor.[102] The note also states that it was pestilential for the French.[103] Strangely, there is no summary for 1320 but the one for 1321 again talks of poor harvests "like in the other years."[104]

To round off this study of the chronicle sources of the Agrarian Crisis,[105] it might be worthwhile to take a glance at the general picture of the geographical distribution of the places of writing of the chronicles that deal with the crisis years. The impression usually given by modern writers who have dealt with the subject is that the famine prevailed over the whole of northern Europe, but since its origin was ultimately in meteorological conditions, which were probably not too uniform, we can expect some real variation in severity from one place to the next, even within England.

Of course, historians that base their accounts to any extent on these chronicles must at the same time recognize that as national chronicles, their observations were intended to apply to England as a whole. Within the general picture, however, there may be some variations that can be explained on the basis of the geographical perspective of individual chronicles, and for this reason a look at the geographical distribution of the chronicles within England may be of value. It will not lead to any real hard and fast conclusions by itself, but it will provide certain indications. And it will show how few areas were represented by having their own national chronicles.

Of the fourteen chronicles studied above that have unique material for the reign of Edward II, six are from the London region. This includes those from the Abbey of St. Albans. The places of writing of the other chronicles are thinly spread throughout the rest of England. None are known to have been written along the south coast, or on the peninsula, west of Malmesbury. There is no evidence for any chronicle having been written in East Anglia, and only the late Bridlington chronicle is known to have been written on the east coast.

In the first group, the contemporary group, only the provenance of the *Nicholai Triveti Annalium Continuatio* is unknown. For the rest, two were written in the London region and two were written in the West Country--the *Polychronicon* was written at Chester and the *Vita Edwardi Secundi* probably in Herefordshire. The North Country is not represented.

Four chronicles of the second group were written within seventy miles of London. The other two, the Lanercost chronicle and the *Brut*, are of unknown provenance, but in both cases there is a strong suggestion that they are of North Country origin, or at least had strong North Country influence. Without going into the third group in the same detail, since the group as a whole was more influenced by previous chroniclers than by the locality of their authors, it becomes apparent that the area around London was always unduly represented by the number of national chroniclers that it had actively writing.

The fourteen chronicles that have been discussed in these two chapters contain the vast majority of the evidence about the Agrarian Crisis that is to be found in the national chronicles. There is, as well, a considerable body of evidence to be found in the local

chronicles, too numerous to be dealt with in a similar fashion here. The local chronicles normally concern themselves only with the events immediately pertaining to the abbey or institution in which they are written, and therefore their agrarian and meteorological evidence is of correspondingly limited value. It does happen, however, that some of these chronicles dabble in national events to the extent that they would have some claim to inclusion in the list of national chronicles. The decision of which to include in this study has therefore had to be a little arbitrary in some cases.

Similarly, it is also difficult at times to determine what exactly constitutes a chronicle. The term "chronicle" can be used to cover works that range from the insignificant *Chroniculum* of Geoffrey Baker and the equally insignficant *Chronicon Brevius* by the author of the *Eulogium*, both of which cover the history of the world from Creation to the lifetime of the authors in a few pages, to the chronicles of length and value such as that of Murimuth.

The term can also include small valueless fragments of what appear to have been full chronicles, chronicles that might not perhaps have been valueless in their entirety had they survived intact. Among these are the three St. Albans fragments which each cover a small portion of the reign of Edward I.[106] Are these evidence of three distinct chronicles, or are they all parts of the same chronicle, as Galbraith has suggested?[107] In either case, it is not known for certain who wrote them, or when they were written, although there is a good possibility that they belong with the chronicles written during the Agrarian Crisis, even if they contribute nothing to the knowledge of the crisis itself.

There are also the chronicles which have never been published and which, for that reason, have not been dealt with here. These include such works as a series of notes "on the wars of England with France and Scotland, starting with the coronation of Edward I and running on in a very unconnected way to the battle of Poictiers and the death of King John of France;"[108] and also a forty page chronicle from Creation to the capture of Calais.[109] Both of these are from Bodleian 101, a manuscript in which the main interest seems to be that it contains part of the Bridlington chronicle, and they are mentioned here primarily by way of illustration of works that are inaccessible to the writer. Neither is listed in T.D. Hardy's *Descriptive Catalogue* which is the only attempt that has been made of listing all the sources, manuscript or published, for the early history of Great Britain.[110] The catalogue only comes down as far as the year 1327, however, and all chronicle materials which end at a later date have not been listed. Most of these manuscript materials have not been edited simply because they have been regarded as of little historical value. There can be no certainty of the validity of this evaluation of their worth for the Agrarian Crisis, however, until they have been examined, for those who were once judging their value were interested, for the most part, in political and constitutional information. The value of a weather observation, for instance, would have been quite minimal to them.

So it is to be realized that conclusions arrived at in this study about the chronicle-writing related to the Agrarian Crisis must be tentative, for the groundwork for the study of that subject is far from complete. It is not even impossible, in fact, that fourteenth-century

chronicles giving important information on the Agrarian Crisis may yet be discovered. Nevertheless, the existing chronicles do present a substantial amount of information, and on the basis of this certain conclusions, both about the chronicle-writing situation during and after the Agrarian Crisis, and about the actual nature of the Agrarian Crisis itself, are strongly indicated.

First of all, it is a curious fact that while there was a definite drop in chronicle-writing during the Agrarian Crisis, the fluctuation does not show up when one is dealing with the question of the increase or decrease of original accounts for individual years. There are, for example, almost exactly as many original accounts for the year 1312 as there are for the year 1324. Going year by year, one finds that the number of original or independent accounts for any given year hardly varies from 1300 to 1330, and perhaps beyond. This seems to be so because chroniclers generally tended to make up the deficiencies of their predecessors, even to the extent of researching and writing original accounts of a previous generation. Naturally, however, there is greater variation in the quality of these accounts than in the number of them.

Secondly, it is to be noted that the second group of chroniclers discussed present a somewhat different picture of the Agrarian Crisis than that presented by the first group. There is less emphasis in their accounts on the preliminaries, the cold winter of 1309/10 and the high prices of 1310, but there is much greater emphasis on the latter part of the famine. The second group paints a much more vivid picture of the animal mortality and shows that even after 1317 there

are bad harvests. There is also some indication that there was a renewed period of dearth in 1322, at least in parts of England. The second group's emphasis on the end of the Agrarian Crisis makes it tempting to conclude that just as a perspective of some eight to ten years was necessary before chroniclers saw fit to write of the famine, so a similar span of time had to pass before they saw the last years of the crisis in a significant perspective. Eventually, as in the case of the third group of chroniclers, the multiple events of the crisis years came to be seen as a distinct whole, analogous in a way, to the depression "decade" of our own era.

The second group of chronicles also help to clarify one important question of detail left by the first group. The impression left by the latter was that there had been a cattle mortality but that it was of uncertain date. Later accounts, especially Trokelowe's make it clear that there were two separate cattle "murrains" or mortalities, that of 1315-1316 and that of 1319. The distinctness of the second of these, the 1319 mortality, will be examined in further detail in the fourth chapter.

Finally, it should be recognized that the many chronicle observations about the Agrarian Crisis were made in spite of what must be termed a general disinterest in things agricultural or meteorological on the part of the chroniclers. On the whole, they tended to note the events of the crisis in the same way that other *monstra*, or unusual phenomena, such as eclipses, are customarily mentioned, that is, in brief memoranda. The result is that their accounts have probably "short-changed" this particular aspect of their history to a considerable degree.

Today, when it is very much more difficult for the imagination to fill in the details around the chroniclers' statements, since the reader is without a firsthand knowledge of the plight of the fourteenth-century poor, it is still nevertheless clear that a time of real hardship was suffered by the English during those years. The question that now must concern us, is to what extent the impressions given by the chronicle accounts can be corrected or supplemented by additional evidence, by the findings of those historians who have studied the record sources, and more especially, by the findings of those newcomers to the field of fourteenth-century history, the scientists.

The chronicle accounts leave many questions unanswered and many areas unclear. In the next chapter the main area that will be dealt with is the question of the scope of the Agrarian Crisis. When really did the trouble start and when did it end? On what scale was this event?

NOTES TO CHAPTER TWO

[1] Graves, *Bibliography*, p. 439.

[2] Murimuth mentions his age at various points throughout the chronicle making it possible to deduce the year of his birth, although there is the added problem that he employed the unusual dating system of beginning the year at Michaelmas.

[3] For the fullest biographical treatment of Murimuth see Stubbs, *Chronicles of Edward I and Edward II*, vol. 1, pp. lx-lxxiv.

[4] Ibid., p. lxviii.

[5] Ibid.

[6] *Adae Murimuth Continuatio Chronicarum, Robertus de Avesbury De Gestis Mirabilis Regis Edwardi Tertii*, ed. with an introduction by Edward Maundle Thompson, RS, no. 93 (London, 1889), p. 24.

Murimuth's chronicle also contains an interesting story which may perhaps be shown to have some relevance to the famine. Although it pertains only to France and not to England, I will quote it here because of the impact that it had on English chroniclers:

"In the year of the Lord 1320, the fifth year of Pope John, and the fourteenth year of King Edward, the lepers were defamed almost throughout the whole of Christianity, because they were to have entered into a pact with the Saracens to poison Christians of countries everywhere; and so they did in many places, putting poisons in the fountains, wells, barrels, and other places. For this many people in Provence and France were convicted and burned; and Jews were detained and imprisoned, on account of assistance and consent lent to them, as it was said." ("*Anno domini millesimo ccc^mo xx., et ipsius Johannis papae v^to., ipsius vero regis Edwardi xiiij^o., fuerunt diffamati leprosi quasi per totam Christianitatem, quod ipsi deberent iniisse foedus cum Saracenis ad intoxicandum Christianos ubique terrarum; et sic in multis locis fecerunt, ponendo venenum in fontibus, puteis, doliis et aliss locis. Super quo fuerunt multi in Provincia et Francia convicti et combusti; et Judaei detenti et incarcerati, propter auxilium et consensum praestitum, ut dicebatur.*" *Continuatio Chronicarum*, p. 32.)

This indiscriminate search for scapegoats, which Murimuth recounts *sub anno* 1320, may very well be a delayed reaction to an earlier

event. The tale of contaminated water supplies, especially stagnant ones, points very strongly to the possibility of typhoid fever, which has already been postulated as the "famine pestilence" referred to by the chroniclers.

This event is recounted also in Robert of Reading, *Flores*, vol. 3, pp. 195-195 (and here at greater length than in Murimuth); in "Chronicle of Lanercost," *SHR*, vol. 9, p. 69; and in Walsingham, *Ypodigma Neustriae, Chronica Monasterii S. Albani*, vol. 7, ed. by Henry Thomas Riley, RS, no. 28 (London, 1876).

[7] Murimuth, *Continuatio Chronicarum*, p. 74.

[8] Ibid., pp. 88-89.

[9] Stubbs, *Chronicles of Edward I and Edward II*, vol. 1, pp. lxii-lxiii.

[10] It may not have been affected at all. Lucas, "The Great European Famine," *passim*, gives the impression that it was affected, although not too severely, but Kershaw, "Agrarian Crisis," p. 5n., specifies that "there is no evidence of a famine in southern Europe in 1315-17."

[11] Stubbs, *Chronicles of Edward I and Edward II*, vol. 1, p. lxiii.

[12] Ibid.

[13] Kershaw, "Agrarian Crisis," pp. 24-29.

[14] *Chronicles of Edward I and Edward II*, vol. I, pp. 252-370.

[15] Ibid., pp. lxix-lxxiv.

[16] H.G. Richardson, "The *Annales Paulini*," *Speculum*, vol. 23 (1948), pp. 630-640.

[17] Stubbs, *Chronicles of Edward I and Edward II*, vol. 1, p. xlii.

[18] Richardson, "The *Annales Paulini*," p. 638.

[19] *Chronicles of Edward I and Edward II*, vol. 1, p. 268.

[20] Ibid., pp. 309-310.

[21] Ibid., pp. 278-279.

[22] Ibid., p. 278.

[23] Ibid.

[24] Ibid., p. 279.

[25] Even the price that Trevet's continuator gives is hard to believe. Rogers, *History of Prices*, vol. 1, pp. 478-481, gives price averages for every year from 1260 to 1400. The average of these averages works out to be about 6 1/2 pennies a bushel. On the average the prices almost double after the Black Death, but even so the price average given by Rogers for the year 1315 is the highest in the entire 141-year period. It is 1s. 8 1/4d. a bushel, about a third of the price given by the continuator of Trevet. The latter's price may nevertheless be possible if one supposes that salt was particularly scarce and expensive in the London region. Not that there is any special reason for associating Trevet's continuator with London, but it is interesting to note that the other chronicles that mention the price of salt all have a London provenance.

[26] *Chronicles of Edward I and Edward II*, vol. 1, pp. 312-313.

[27] This conclusion is based primarily on an allusion within the chronicle to the death of Roger Mortimer the Younger, Earl of March, who was executed in 1330. See Henry Thomas Riley's introduction to Trokelowe's *Annales* (p. xvi).

[28] Ibid.

[29] *Dictionary of National Biography*, s. v. "Trokelowe, Throklow, or Thorlow, John de," by William Hunt.

[30] Trokelowe, *Annales*, pp. 89-90. To be precise, Trokelowe is quoting the letter of the Viscount of Essex and Hertford to the bailiff of the liberty of St. Albans. The letter quotes the king's letter in full which in turn contains the text of the ordinance.

[31] Ibid., p. 90.

[32] Ibid., p. 92. The quotation in its full context is as follows: "*Anno domini millesimo trecentesimo quinto-decimo, praeter supradictas angustias, quibus Anglia affligebatur, accrevit fames in terra, acsi non placeret Deo in Statutis praemissis.*" The key word here is *accrevit* which normally means "increased"--and so the editor

takes its meaning, judging by his margin note--but which here might just as well mean "was added to" in the sense that *fames* was added to the *supradictas angustias*.

[33] Ibid., p. 89.

[34] Ibid., p. 93: "*Dicta quidem caristia mense Maio, anno Domini millesimo trecentesimo quinto-decimo, incepit, et usque ad festum Nativitatis Beatae Mariae duravit. . . . Versus finem autumni, ipsa caristia in parte fuerat mitigata, sed circa festum Natalis Domini totaliter redibat.*"

[35] Ibid., p. 92: "For a quarter of wheat, or of beans, or of peas, was sold for twenty shillings, a quarter of malt for a mark, and a quarter of oats for ten. But a quarter of salt was commonly sold for thirty-five sillings, which from past centuries was completely unheard of." ("*Quarterium enim frumenti, fabarum, et pisarum, pro viginti solidis vendebatur, braesii pro marca, et avenarum pro decem. Sed quarterium salis pro triginta quinque solidis communiter vendebatur; quod a saeculis praeteritis est penitus inauditum.*")

[36] Ibid., p. 92.

[37] Ibid.

[38] Ibid., p. 93.

[39] Ibid., p. 92.

[40] Ibid., p. 93: "*Nec est ambigendum, quin pauperes fame et inedia contabescerent, si divites post refectiones opulentas continuo esurirent.*"

[41] Ibid., p. 94. In a fairly philosophical passage in which he speculates a little on the meaning of the events, Trokelowe switches into the third person plural. This passage contains the following sentence: "Furthermore, we ponder on those entering the city sickened with hunger when we see the poor and destitute, weighed down by the same famine, lie neglected and dead through the villages and pathways." ("*Attenuatos autem fame perpendimus civitatem introeuntes, cum pauperes et egenos, ipse fame oppressos, per vicos et itinera squalentes et mortuos jacere conspicimus.*") The use of "we" may simply be a way of identifying with his readers in these thoughts, or it may just as well represent a personal experience.

[42] Ibid.: "*Ipsa igitur fame totam terram sic opprimente, mortalitas hominum subsecuta est. Tot enim moriuntur egeni, quod vix sufficiunt vivi ad sepulturam mortuorum. Morbus enim dysentericus, ex corruptis cibis conceptus, fere omnes maculavit; quem sequebatur acuta febris, vel pestis gutturuosa.*

Et sicut homines, ex ciborum corruptione intoxicati, succumbebant, sic bestiae et pecora, ex herbarum putredine infectae, morticinio corruebant; nec se meminit aliquis tantam caristiam et famem praevidisse, nec tantam mortalitatem secutam fuisse. Nec potuit in hac pestilentia contra praedictos morbos prudentia physicorum, prout antiquitus solebat, aliquod congruum in arte sua reperire remedium. Herbae enim medicinales, quae mortalitatis tempore levamen languidis solebant conferre, propter aeris intemperiem, et inordinatam elementorum collisionem, contra suam naturam degeneratae, virus pro virtute reddebant."

[43] Ibid., p. 93. "*Nec habebat panis robur nutritivum, seu virtutem substantialem more solito in se, pro eo quod grana a calore solis aestivi nutrimentum non habebant. Unde comedentes ex eo, licet magnum exinde sumerent quantitatem, brevi elapso intervallo famelici remanebant.*"

[44] Ibid.

[45] Ibid., p. 95.

[46] Ibid.

[47] Ibid., pp. 104-105: "*Sub ejusdem anni curriculo, tam pestifera armentorum mortalitas per totam Angliam invaluit, quantam ullus se meminit praevidisse. In qua peste hoc evenit mirabile, quod de pecorum mortuorum cadaveribus etiam canes et corvi qui vescebantur, illico intumuerunt, et infecti obierunt. Unde nullus erat hominum, qui carnes bovinas gustare praesumebat, ne forte de morticiniis eorum intoxicatus succumberet. Tempore quidem Paschali in Essexia incepit, et per annum integrum duravit. Dictum est etiam, quod tota Gallia eadem labe per idem tempus extitit coinquinata.*"

I would like to point out that I have yet to find any corroborating evidence for Trokelowe's assertion that the animal mortality occurred in France as well. Admittedly, I have only looked into this question in a preliminary and cursory fashion, and the corroborating evidence may well exist in some French chronicle, although I am inclined to doubt it.

[48] Ibid., p. 125.

[49] "Chronicle of Lanercost," *SHR*, vol. 8, p. 399.

[50] Ibid., pp. 390-391.

[51] "Chronicle of Lanercost," *SHR*, vol. 9, p. 76.

[52] Little, *Franciscan Papers*, p. 51.

[53] Ibid., pp. 51-54.

[54] Ibid., p. 51.

[55] *Chronicon Galfridi le Baker de Swynebroke (1303-56)*, ed. with an intro. by E. Maunde Thompson (Oxford: The Clarendon Press, 1889). This edition also contains the *Chroniculum*, a very short chronicle which Baker wrote in 1347. It has about three pages dealing with the reign of Edward II and makes no mention of famine or pestilence.

[56] Ibid., p. 9.

[57] V.H. Galbraith, "Extracts from the *Historia Aurea* and a French '*Brut*' (1314-47)," *EHR*, vol. 43 (1928), p. 203; John Taylor, "The French '*Brut*' and the reign of Edward II," *EHR*, vol. 72, no. 284 (July 1957), p. 425; and Graves, *Bibliography*, pp. 409, 429.

[58] Galbraith, "Extracts," p. 203.

[59] Ibid.

[60] Taylor, "The French '*Brut*,'" p. 425; see also Graves, *Bibliography*, p. 429. Special mention should be made of one chronicle, written by John of Tynemouth, who probably began it in the 1360s, which is called the *Historia Aurea*. Because it appears to be primarily a compilation, an expanded version of the *Polychronicon*, it has never been published. But V.H. Galbraith, "Extracts," p. 204, points out that it is such a considerably expanded version of the *Polychronicon* that it should be regarded as a distinct chronicle worth studying on its own, and he quotes some extracts from it to show the kind of new information that awaits the researcher within the many volumes of that chronicle. One of these passages is highly relevant to the animal mortality of 1319 and is quoted in chapter four of the thesis. For additional information on the *Historia Aurea*, see V.H. Galbraith, "The *Historia Aurea* of John, Vicar of Tynemouth, and the Sources of the St. Albans Chronicle (1327-1377)," *Essays in History Presented to Reginald Lane Poole*, ed. by H.W.C. Davis (O.U.P., 1927), pp. 379-398.

[61] Taylor, "The French '*Brut*,'" p. 425, translates the nomenclature used by Friedrich Brie, *Geschichte und Quellen der Mittelenglischen Prosachronik: The Brut of England oder The Chronicles of England* (Marburg: n.p., 1905).

[62] Taylor, "The French '*Brut*,'" pp. 424-426.

[63] Ibid., p. 425. This chronicle, which might best be thought of as a local chronicle, is relatively short and sparely written. Its author is unknown and so also is its date of writing, although the period that it covers (1260 to 1343) and the handwriting of the manuscript suggest that it was written about the middle of the fourteenth century (George James Aungier, *Croniques de London*, Camden Series no. 28 [London: Camden Society, 1894], p. a). It has some entries that are of relevance to this study: the cold winter of 1309/10 is mentioned (p. 35); it describes the rain of 1315 as lasting from Pentecost (May 11) to the following Easter (p. 38); it states that in 1316 a quarter of wheat sold for 38s. and for 40s., and salt for 40s.--presumably that is 40s. a bushel (p. 39); it describes continued famine in 1317 (p. 40); and it describes famine in the north in 1322 (p. 45).

The last two entries mentioned are of considerable interest. It is the only chronicle which describes conditions in 1317: "X Edward II: The great dearth still lasted. This year in July there was a great thunder, and a great fall of water, which did great damage to Fleet bridge and Holborn bridge." ("*Uncore durra la graunt chiertée. Cele an en Juille fut graunt toneire, et graunt goute d'ewe, qe fit graunt damage al pount de Flete et al pount de Holborne.*")

It is also the only chronicle that states that the food scarcity of 1322 extended beyond the army and beyond the north country, affecting the whole of England. Preceding its entry on the famine in the army that year is the following: "XV Edward II: At that time a bushel of wheat was selling for 3s. 8d." ("*En cele temps l'on vendit le bussel de furment à iij. sold. viij d.*") This works out to 29s. 4d. a quarter.

[64] Taylor, "The French '*Brut*,'" p. 425.

[65] *The Brut; or, The Chronicles of England*, vol. 1, ed. with an introduction by Friedrich W.D. Brie, Early English Text Society, Original Series, no. 131 (London: Kegan Paul, Trench, Trübner & Co., 1906).

[66] Taylor, "The French 'Brut,'" p. 434.

[67] Ibid., pp. 428, 435.

[68] *The Brut*, pp. 209-210: "*And þat same tyme bifelle meny meschyues in Engeland; for þe pore peple deide in Engeland for*

hunger; and so miche and so faste folc deiden, þat vnneþes men m[i]ght ham bury; for a quarter of whete was worþe xls., and ij ȝere and an halfe a quarter of whete was worþe ij marȝ; and ofte-tymes þe pore peple stale childern and ete ham, and ete also all þe houndes þat þai might take, and ek Horse & cattes; and after, þere felle a grete pestilence amonges bestes in diuerse contrees of Engeland duryng Kyng Edwardes lif."

69 Herbert Maxwell, in his introduction to his translation of *Scalacronica, the Reigns of Edward I, Edward II and Edward III*, by Sir Thomas Gray (Glasgow: James Maclehose & Sons, 1907), p. viii.

70 Graves, *Bibliography*, p. 426. According to Galbraith, "Extracts," p. 204, any material on the reign of Edward II that came from the *Polychronicon* most probably came by way of the *Historia Aurea*.

71 Gray, *Scalacronica*, p. 65.

72 Unless, of course, one wishes to include the usual entry about famine (and sickness, in this instance) in the army against the Scots. The date is not given here, but we may presume 1322 (Gray, *Scalacronica*, p. 69).

73 Frank Scott Haydon, ed., in his introduction to *Eulogium: Historiarum sive Temporis: Chronicon ab Orbe Condito usque ad Annum Domini M.CCC.LXVI.*, vol. 1, RS. no. 9 (London, 1858), pp. xxvi-xliii.

74 Haydon, *Eulogium*, vol. 2, pp. viii-xxii; and Graves, *Bibliography*, pp. 421-422.

75 *Eulogium*, vol. 3, p. 195: *"Anno Domini MCCCXIX, et anno sequenti per totam Angliam facta est magna fames, quia annonae omnino deficiebant in Anglia et in Francia, nam summa frumenti vendebatur pro XL. solidis.*

"Anno Domini MCCCXXI. mortalitas hominum facta est talis qualis ante nusquam visa est; certum est illam fuisse in regionibus propinquis ad Angliam in omni parte, creditur tamen fuisse per totum mundum et maxime defectum victualium."

Much of the account of Edward II's reign in this chronicle is drawn from Geoffrey Baker's *Chronicon*, and Baker used the Michaelmas to Michaelmas dating system which tended to put his accounts a year behind. Whether the author of the *Eulogium* has back-dated his famine accounts, which are not taken from Baker, in order to match the rest can only be guessed at. It could at least count for part of the discrepancy.

It should also be noted that a *summa* is generally the equivalent of a quarter.

[76] *Eulogium*, vol. 3, p. 307.

[77] These events are: the beheading of Gaveston; the Battle of Bannockburn; and the beheading of Thomas, Earl of Lancaster. The famine, whatever its extent in time, is certainly rated among the turning points of Edward's reign in this summary.

[78] Stubbs, *Chronicles of Edward I and Edward II*, vol. 2, pp. xxv-xxvi.

[79] Ibid., p. xxvi.

[80] Ibid., p. xxvii.

[81] Ibid., p. 48.

[82] Ibid. The prices given are as follows: a quarter of wheat sold for between 24 and 32 shillings, and a quarter of white salt for the same price. Barley, beans, and peas each went for 14s. a quarter, oats for 10s. a quarter, and malt for 16s. a quarter. It is interesting that this is the only non-London chronicle to mention the price of salt, and it, too, quotes an incredibly high figure.

[83] Ibid.: ". . . *memorandum quod terrae sterilitas et omnium fructuum raritas sive defectus, ac etiam omnium cibariorum venalium caristia, quamvis non ad eadem pretia, duravit continue per sex annos; similiter mortalitas hominum et morina armentorum tanta, talis et continua fuit, quanta et qualis a seculo non est visa.*"

[84] Ibid.

[85] Ibid., p. 81.

[86] V.H. Galbraith, "Thomas Walsingham and the Saint Albans Chronicle, 1272-1422," *EHR*, vol. 47 (1932), pp. 15-19.

[87] Riley, *Historia Anglicana*, vol. 1, p. xvii. Riley does not actually mention Baker's chronicle as a source but he does refer to the *Vita et Mors Edwardi Secundi* which has since been recognized as Baker's chronicle slightly reworked (there are small differences in phrasing here and there). It is safe therefore to transfer to Baker certain of the passages that Riley has accredited to the author of the *Vita et Mors Edwardi Secundi*.

[88] Gransden, *Historical Writing*, pp. 363-364.

[89] V.H. Galbraith, ed., in his introduction to *The St. Albans Chronicle 1406-1420* (Oxford: The Clarendon Press, 1937), pp. xxxv-xxxvi.

[90] These summaries continue until 1328, after which they appear sporadically.

[91] Walsingham, *Historia Anglicana*, vol. 1, p. 143. Under 1313 it says: "It was sorrowful, shameful and destructive for the Angles because of the infamous victory of the Scots." (". . . *Anglis lugubris, probosus, et damnosus, propter infamem Scotorum victoriam.* . . .") These summaries usually contain a short political summation following the weather generalization.

[92] There are two summaries, and fairly contradictory ones at that, for the year 1307. Before that, the summaries appear to be in synchronization with the medieval calendar year. It seems that with the break in the chronicle that marks the end of one reign and the beginning of the next, a summary is given both for the last year of Edward I's reign and the first year of Edward II's even though these were the same year. This may be an indication that Walsingham switched sources for his summaries at this point and that consequently the *Chronica Willelmi Rishanger* never actually went beyond 1307. The longest manuscript of it ends in mid-sentence in that year, and it has always been wondered whether it ever extended beyond that point. The contradictions between the two 1307 summaries would then be explained by the fact that the new source used a different dating system from the old one and that they therefore refer to different years.

[93] Walsingham, *Historia Anglicana*, vol. 1, p. 128.

[94] Ibid., p. 135.

[95] Ibid., p. 137.

[96] Ibid., p. 143.

[97] Ibid., p. 122.

[98] Ibid., p. 145: "*Transit annus iste saevus Anglicis et crudelis, duplici contritione conterens Anglicos, fame videlicet, et peste quam ex fame contraxerant.*"

[99] Ibid., p. 148.

[100] Ibid., p. 153.

[101] Ibid., p. 155.

[102] Ibid., p. 157. The summaries generally refer to two categories: *fructus*, which appears to be roughly what our word "fruit" denotes, and *fruges*, which denotes all other produce, grain included.

[103] See note 6 of this chapter for a possible explanation of the French pestilence referred to.

[104] Walsingham, *Historia Anglicana*, vol. 1, p. 163. No material on the Agrarian Crisis has been discussed here because it is largely a repetition of the material that is found in the other chronicles. The only item of interest is a notice that there was a drought in the summer of 1325 and in the following year (p. 177). This is an amplification of the notice of the 1325 drought found in the *Annales Paulini*.

[105] *The Chronicle of Henry Knighton* (1066-1395) has not been dealt with here because it is not original for the reign of Edward II, at least not for the most part. It was written long after Edward II's reign and relied mainly on Higden and Guisborough as sources for that period. However, there are two original notices of the famine *sub anno* 1317 which deserve mention here. The first of these is Knighton's second notice of the dearth (the first was a verbatim copy of Higden's reference to the famine in his summary of Edward II's reign) and is the most circumstantial explanation of the exorbitant wheat prices that is to be found in any chronicle. Knighton says that for one Saturday in 1317 wheat was going at 44s. a quarter in Leicester fair but was down to 14s. a quarter by the following Wednesday (*Chronicon Henrici Knighton, vel Cnitthon, Monachi Leycestrensis*, vol. 1, ed. by Joseph Rawson Lumby, RS, no. 92 [London, 1889], p. 411). He also says that many rich people were driven to beggary (p. 411) and that there was a mortality of men and animals in 1317 which occurred again in 1319 (p. 412). Apparently he regards the animal mortality of 1319 as merely a recurrence of the 1317 disease. In any case, this should certainly be read as further support for the conclusion that there were two separate episodes of cattle mortality.

Knighton also says (p. 412) that the two cardinals sent to mend the peace between Edward and the Earl of Lancaster, and between the English and the Scots, were sent as a consequence of the Pope's commiseration for the sufferings of the English under the pestilence of that time. Here is a rare instance in which a chronicler is attributing political consequences to the Agrarian Crisis.

[106] *Willelmi Rishanger, Chronica*, pp. 437-499.

[107] Galbraith, *St. Albans Chronicle*, p. liin.

[108] Stubbs, *Chronicles of Edward I and Edward II*, vol. 2, p. xix.

[109] Ibid., p. 20.

[110] Thomas Duffus Hardy, *Descriptive Catalogue of Materials Relating to the History of Great Britain and Ireland to the End of the Reign of Henry VII*, 3 vols, RS, no. 26 (London, 1871).

CHAPTER THREE

An Examination of Weather during the Agrarian Crisis

"From a great flood of summer rains, a real famine was created, with produce perishing everywhere."[1] This entry for the year 1316 from one of the local chronicles, the *Chronicon Angliae Petriburgense*, directly attributes the famine to the excess of rain. In this it is in agreement with almost all of the other chronicles, which consistently describe the famine as having been caused by unusually excessive, prolonged, and unseasonal rains, and by the floods that these rains engendered. And while different chronicles emphasize different aspects of the wetness, the *Vita Edwardi Secundi*, for example, asserts that the soggy conditions actually made it impossible to harvest the grain in many cases, and the *Flores* and Trokelowe's *Annales* both state that the crops never even came to maturity, the overall impression given is a consistent one: rain destroyed the harvest completely.

On the basis of the chronicle accounts, therefore, it can be said with great confidence that the harvest failures of the years 1315, 1316, and 1317, were all caused by excessive rainfall. Outside of those years, however, there are problems both with the incompleteness of the evidence and with its internal contradictions, and for this reason modern historians have tended to err on the side of caution and have generally delimited the famine to those three years.

Nevertheless, careful analysis of the available evidence permits further conclusions to be made with reasonable confidence. Firstly, as has been shown, there are a number of chronicles which indicate the existence of wet conditions and a bad harvest in 1314 as well, and these tend to be the chronicles of the first group, the ones nearest to the events and fullest in their treatment of the beginnings of the famine. Their accounts must be given preference. The neglect of the year 1314 in subsequent chronicles must be looked at simply as a matter of proportion. A year like 1314 would have been counted as a bad year at any other time, but it was so greatly eclipsed by the catastrophic disasters of 1315 and 1316[2] that its severities have almost been ignored. And modern historians have reacted similarly. Lucas briefly pointed out that the harvests were not very good for several years before 1315, and that there was much rain in 1314,[3] but he nevertheless dated the famine from 1315. Kershaw mentions the severities of 1314 as well,[4] but for him too the famine or crisis dates from 1315.

Before 1314, however, there is absolutely no reference to excessive rainfall in any of the chronicles that have been discussed. At that same time there are still real indications that things had begun to go wrong long before 1314. The *Nicholas Triveti Annalium Continuatio* reports a dearth in the year 1310 and the annual summaries found in Walsingham indicate that that year was the first of a series of bad harvests. These problems demand an explanation as well, but can they too be considered the result of unusual weather phenomena?

There can still be found additional evidence from the records and local chronicles; *The Chronicle of St. Mary's, York,* for example, states that in 1303 "from St. Michael's day through fifteen months there were frequent rains throughout almost the whole of England."[5] This may be an indication that the pattern of raininess had begun long before 1314. But this, and similar items of information, will be nothing more than indications unless the larger weather patterns of the first quarter of the fourteenth century are looked at as a whole, with a view to making sense of them in meteorological terms. Then only can the gaps in the chronicle evidence be filled.

Fourteenth-century English weather has already been a matter of serious study and discussion for some time in another context. As it is, any research into the meteorological situation in the years of the Agrarian Crisis automatically stumbles into the larger controversy of whether or not there was a serious climatic deterioration of long-term duration that set in around the year 1300.

In 1955 a Swedish economic historian named Gustav Utterström published an article in the *Scandinavian Economic History Review* in which, among other things, he listed the major arguments for the fourteenth-century climatic deterioration,[6] and argued that this had had a large part in causing the economic depression of the fourteenth and fifteenth centuries,[7] and in bringing about the downturn of the population growth around 1300.[8] Utterström's article was not a product of new research but rather it was a telling assemblage of information from scattered and much-ignored writings related to climatic history, none of which had had much impact by themselves, but which together gained a new forcefulness.

Utterström's article was unusually wide-ranging in the arguments it presented, touching on as diverse matters as the disappearance of the Greenland colonies in the late Middle Ages,[9] the cessation of grain-growing in Iceland,[10] and the evidence to be gleaned from the study of the varying levels of the Caspian Sea over the centuries.[11] As far as England was concerned, however, the only medieval matters of a climatic nature discussed were the theory that the vine crop disappeared from England in the fourteenth-century due to a shortened growing season[12] and also the belief that an increasing number of crop failures occurred during the same century.[13] The latter has a more direct bearing than the former on the study of the Agrarian Crisis because the harvest failures of the crisis years are the only ones cited by Utterström for England in support of this belief.[14] However, in both cases, the discussion suffers quite markedly from chronological vagueness, and consequently, for England as well as for the rest of Europe, the reader is merely left with a general awareness that a climatic deterioration took place in the late Middle Ages. However, it should be recognized that it is quite possible that the exceptional meteorological conditions that caused the Agrarian Crisis might very well constitute the first evidence of the long-term climatic change in England. In that case, the Agrarian Crisis would have a much deeper significance for English history than historians have yet been willing to admit.

It should also be noted that while the studies of the Agrarian Crisis have focussed on the excessive amount of rain and flooding that occurred throughout western Europe at the time, the concept of climatic deterioration concerns itself more with falling temperature than with

increased rainfall. For this reason, the unusually cold winter of 1309-1310 when the Thames froze over very solidly, a winter mentioned in a number of chronicles, assumes a greater importance. So, too, does the winter of 1305-1306 which is described in very severe terms in the Tintern version of the *Flores Historiarum*[15] and in *The Chronicle of St. Mary's* in York.[16]

From the point of view of the meteorologist, however, any weather reference of any kind whatever is relevant to the goal of reconstructing the events. At the time that Utterström wrote, the standard text on climatic history was *Climate through the Ages* by the British meteorologist C.E.P. Brooks.[17] As far as the medieval period was concerned, this book was essentially a catalogue of all the different kinds of weather evidence that anyone had ever put together, from lists of storms to references to wind direction. One obscure study cited that pertains to early fourteenth-century England, for example, was Leonard S. Higgin's article in *Archaeologia Cambrensis* which demonstrated, on the basis of studying blown sand dunes, that a period of stormy winds from the west or south-west began around the year 1300.[18]

Brooks was interested more in assembling evidence than in analysing it, at least in the case of the medieval period, and his work did not contain any reference to a late medieval climatic change. There was a recognition that the medieval climate had been unusual in a number of ways, but generally speaking there was a vagueness in chronology that prevented the definition of the sequence of climatic episodes. In 1951, however, there appeared an article in the journal

Nature which managed to add considerable chronological precision to the discussion of late medieval climatic events and which may be regarded as a milestone in bringing about the acceptance of the theory of a fourteenth-century climatic deterioration in scientific circles. This was Axel Steensberg's "Archaeological Dating of the Climatic Change in North Europe about A.D. 1300" which brought together many different arguments for dating the climatic change around the year 1300, most notable of which was his own pollen samplings done on dated medieval sites in Denmark,[19] as well as evidence of glacial advances in the Alps in the fourteenth century.[20]

It was only in the 1960s, however, that the study of the paleoclimatology of the historical period really began to develop,[21] and it was then that the concern of climatologists rapidly shifted from one of simply proving the existence of the fourteenth-century deterioration to actually defining its parameters and describing the details. There was also an increasing reliance on the growing body of climatic research methods that were not dependent on historical documents. As a result, in the last fifteen years roughly, there has been a dramatic advance in the measurement and understanding of weather conditions in the fourteenth century, and of historical climates in general,[22] and much of this research has had the added value of throwing additional light on the years of the Agrarian Crisis.

Before this research is examined, however, there are two points which should be discussed first. The first of these is the fact that there are important reasons for the problems that were, and still are, experienced in defining the chronology of the climatic deterioration.

To a great extent these problems were not so much due to confusion as to the complexity of the climatological processes that were being discussed, and some mention of these processes is necessary at this point, if only for their background significance. The second is the fact that since Utterström's article, and since Britton's collection of chronicle information on weather,[23] there has been a new and rather successful effort at milking the historical documents for more information on weather conditions in fourteenth-century England. This effort, John Titow's "Evidence of Weather in the Account Rolls of the Bishopric of Winchester, 1209-1350," expands the discussion considerably and should properly be dealt with before the non-written evidence is discussed.

As for the special difficulties involved in studying the chronology of the climatic deterioration, these begin with the need for explaining certain superficial discrepancies. In H.H. Lamb's comprehensive work on paleoclimatology, *Climate: Present, Past and Future,* there is reference at one point to the "general turn towards colder climates from A.D. 1200-1400 onwards"[24] and at another point to "the 500-600 years of colder climate between about 1300 and 1900 A.D."[25] The starting point of the deterioration is more often given as around 1300,[26] but the apparent contradiction is due mainly to the fact that these statements are attempts at generalizing about an event that involved a number of stages.

"The climatic worsening of the Late Middle Ages," as it is often called,[27] was directly the result of an expansion of the circumpolar vortex,[28] the system of easterly winds that circle the pole.

This brought about a southern displacement of the "depression tracks,"[29] the belt of storm centres along the front where the polar easterlies come into collision with the westerly winds of the north temperate zone. This southern displacement would mean an increase of storminess and wetness in the middle latitudes,[30] that is, in England and northern Europe, among other places. The change would become increasingly pronounced with time. In Lamb's words, the phenomena accompanying the climatic deterioration, the increased storminess, wetness and cold,

> . . . might be explained by the depression track moving south at a time when there was still much heat stored in the main part of the Atlantic Ocean. Colder conditions set in therewith in Iceland and Greenland but cooling did not become important for some considerable time in Europe.[31]

Hence, the confusion in chronology is largely a consequence of attempts at generalizing for the whole of Europe, sometimes for the whole world.[32] That the beginnings of the deterioration took place much earlier in the far north is clearly shown in a recent article by W. Dansgaard and others of the Greenland Ice Sheet Program.[33] In it a temperature series for Greenland extending back to the year 554 A.D. is compared with a temperature series for England.[34] The English series goes back to 800 A.D. and is based on estimations developed by Lamb both on the basis of historical evidence and scientific studies.[35] The comparison shows an excellent correlation between the two series, but with the qualification that they are consistently two hundred and fifty years out of phase. The coldest period in Greenland was the half-century from 1350 A.D. to 1400 A.D., which corresponds to the coldest period in England roughly two hundred and fifty years later, that is, the period of the Little Ice Age from 1600 to 1650. In Greenland the

cooling that reached its climax around 1400 really began in a pronounced way around 1050, which corresponds to the beginning of the same cooling in England around the year 1300.

The dating of the climatic deterioration is further complicated by the fact that the prevailing patterns of atmospheric circulation fall into distinct summer and winter patterns which would not necessarily show the change at the same time.[36] In England it appears that the cold winters may have preceded the wet summers by a short time.[37] Furthermore

> . . . as with all climatic changes there were year-to-year and decade-to-decade, variations. And during a general decline the coldest and wettest runs of years would produce the severest chocks.[38]

In other words, determining which cold decade is the beginning of a long-term climatic deterioration is a bit like determining which bad harvest constitutes the beginning of the famine. It is largely a matter of judgment, but it seems that in this instance both questions have the same answer. What Lamb calls the "climatic shock" of "the years 1310-19"[39] was the first serious manifestation of the climatic deterioration in England and most of northern Europe.

In this way, the focus is returned to the years of the Agrarian Crisis and the goal of defining as precisely as possible the conditions which were experienced in those years. But in the light of the work of climatologists in defining the beginnings of the climatic deterioration, it is apparent that there is now considerably less basis for accusing the medieval writers of exaggeration in their descriptions, and there is reason for greater confidence in the utilization of the evidence found in the chronicles and in the record sources.

Some of this evidence, the most detailed evidence of human provenance in fact,[40] is that found in the previously mentioned article by John Titow. E. Le Roy Ladurie praises this study as "the most exact study of the crucial years 1310 to 1320,"[41] and succinctly summarizes its findings with respect to the crisis years in these words:

> Using the manorial records of the see of Winchester and working out season by season the meteorological data indicated by the bishop's book-keepers, he notes as very wet the eight years from 1313 to 1320. Apart from 1318, which was so dry that the episcopal ploughs snapped off in the hard ground, there is not one season out of the whole thirty-two in the eight years in question which was considered dry by the people living at the time.[42]

Le Roy Ladurie then goes on to point out that for nineteen[43] of these seasons there is evidence of unusual wetness.[44] Titow's evidence, however, involves certain problems which the above summary tends to conceal. According to the account rolls the years 1313 to 1320 were years which certainly deserved to be complained about, but so it seems were a great many of the other one hundred and thirty-one years that Titow researched. In quite a few instances the problem was drought, but the opposite problem, that of excessive wetness, was also frequent. Le Roy Ladurie isolates the years 1313 to 1320 because he is primarily concerned with the famine and its relationship to heavy rainfall,[45] but there were numerous years outside of these eight years which were years of excessive rain or flooding. While Titow's evidence may be a good illustration of the "remarkable climatic instability" that H.H. Lamb said was characteristic of the period 1200 to 1400,[46] it seems far more likely that the problem is simply that the manorial accounts are extraordinarily sensitive when it comes to measuring deviations

from the norm without being able to indicate "degree of deviation." In other words, if a year is wetter than normal the accounts will indicate this, but they will not indicate how much wetter. A year that is only slightly wetter will appear to be almost as wet as one that is many times as abundant in precipitation. If, on the other hand, one judges solely by the number of weather references per year, only 1315 stands out as excessively bad in the entire first quarter of the fourteenth century.

Titow attempts to solve this problem by using two additional indicators which may give some picture of the relative severity of the various years. Both are, however, crude indicators, and as gauges of the weather they are indirect sources of information and consequently fairly uncertain. These are the price of seed per quarter, and the yield per seed of wheat grain.

The price of wheat is a very uncertain source of meteorological information since there are numerous other factors besides weather that can affect wheat prices. For the period under consideration, however, there is good reason to be confident that weather was the principal factor, since there was no significant destruction of crops by war in the southern areas on which the price research is based, and since the wheat markets were generally local ones that were not responsive to conditions in the north or on the continent.[47]

Still, it should also be borne in mind that as a weather indicator the wheat price would not always give the overall character of a season. It does not necessarily take many days of bad weather to destroy a wheat crop; a couple of weeks of severely unseasonable weather

at the wrong time could make an otherwise perfect year meteorologically seem like a year of total bleakness if one only goes by the wheat prices.

In other words, if it is used judiciously the wheat-price information can provide useful weather clues. More specifically, in cases where the weather is known to have been bad, it can provide some indication of the degree of severity. Information on the yields will give similar weather evidence, since the negative correlation between yields and prices is almost perfect.[48]

In presenting his yield information, Titow does not attempt to discuss the question of what is the minimum yield that can occur before famine ensues, although he does classify the years as good, very good, bad, and very bad, and any year in which the yield deviates over fifteen per cent from the average falls into either the "very good" or the "very bad" categories. This approach, however, creates an illusion of normality around poor harvests, because the period as a whole contains some of the worst harvests in the Middle Ages,[49] and because substantial negative deviations are much more often and easily come by than substantial positive deviations. The result is that the average is bound to be considerably lower than what people then would have considered normal or reasonable. As it is, the average yield in the period studied by Titow (1200-1350) is 3.83 seeds per seed planted, and any year in which the yield fell below that average might well be considered a significantly bad year. During the first quarter of the fourteenth century the following five years fall below the average: 1300, 1310, 1315, 1316, 1317, and 1324. Of these, the three years

1310, 1315 and 1316 are over fifteen per cent below. (Titow was unable to calculate average yields for the years 1303, 1304, 1319, 1321, 1322, and 1323.)

The wheat-price averages present almost exactly the same picture. There are six years in the first quarter of the fourteenth century in which the wheat prices exceed the already high average of 7.49 (Titow gives his averages in shillings and hundredths of shillings, apparently); these years are 1309, 1310, 1311, 1316, 1317, 1318, and 1325. Since the wheat being sold in any given year would be the previous year's crop--Titow uses the "harvest year," that is, September 29 to September 29,[50] for his dating system--the prices for these years are most probably reflections of the quality of the preceding harvests, the harvests of 1308, 1309, 1310, 1315, 1316, 1317, and 1324. (Again, no price averages could be worked out for the years 1304, 1305, 1320, 1322, 1323, and 1324.)

The above statistics give the impression that the famine of 1315-1317 was preceded by a lesser crisis around the years 1308-1310. The information presented by Titow is very incomplete, however, for the years following the famine, and there is a complete gap in the statistics, both of yields and prices, for the years 1322 and 1323. This gap can be filled in by referring to the price statistics compiled by Thorold Rogers in the nineteenth century, which are more complete and based on what appears to be a slightly larger and more widespread sampling, even though they refer primarily to manors belonging to Merton College at Oxford.[51] The average wheat price for the years 1300-1325 works out to be 6s. 12d. and the prices are found to be above

this average in the years 1310, 1311, 1315, 1316, 1317, 1318, 1322, 1323, 1324, and 1325.[52] Again, it must be remembered that these are reflections, for the most part, of the preceding harvests, that is, the harvests of 1309, 1310, 1314, 1315, 1316, 1317, 1321, 1322, 1323, and 1324. Of these years, Rogers considered the years 1315, 1316, and 1321 to have had serious enough harvest failures that each of these three harvests brought a year of real famine in its wake.[53]

Viewed together, then, the figures presented by Rogers and those presented by Titow give the impression of a period of grim harvests that came in three separate waves, so to speak, with crests in 1310, 1316, and 1321, and while the second wave was most severe, the last was most prolonged. Thus, with Rogers's and Titow's calculations in mind, one is better able to speculate on the degree of severity on the meteorological conditions which most probably produced these three waves of famine. And it is quite apparent from the above that the relevant years of the Agrarian Crisis should be extended to include the years from 1309 to 1325.

Returning to Titow's weather information, then, one finds that the first wave really began with the "wet and long" autumn of 1308, which produced a poor, though by no means disastrous, harvest.[54] The pattern of wetness occurring late in the year was repeated again in 1309, although it seems that the rains began too late to affect the harvest seriously.[55] However, the autumn wetness of 1309 lasted long into the following winter when flooding of fields is reported in various places.[56] This is the winter that a number of chroniclers reported as extremely cold, with the Thames freezing over in January.

If the excessive precipitation of the late autumn and early winter continued past Christmas, when the freezing began, one can reasonably suppose a period of heavy winter snowfall. This is implied by the *Nicholai Triveti Annalium Continuatio,* which describes a period of flooding beginning with a sudden thaw in February.[57]

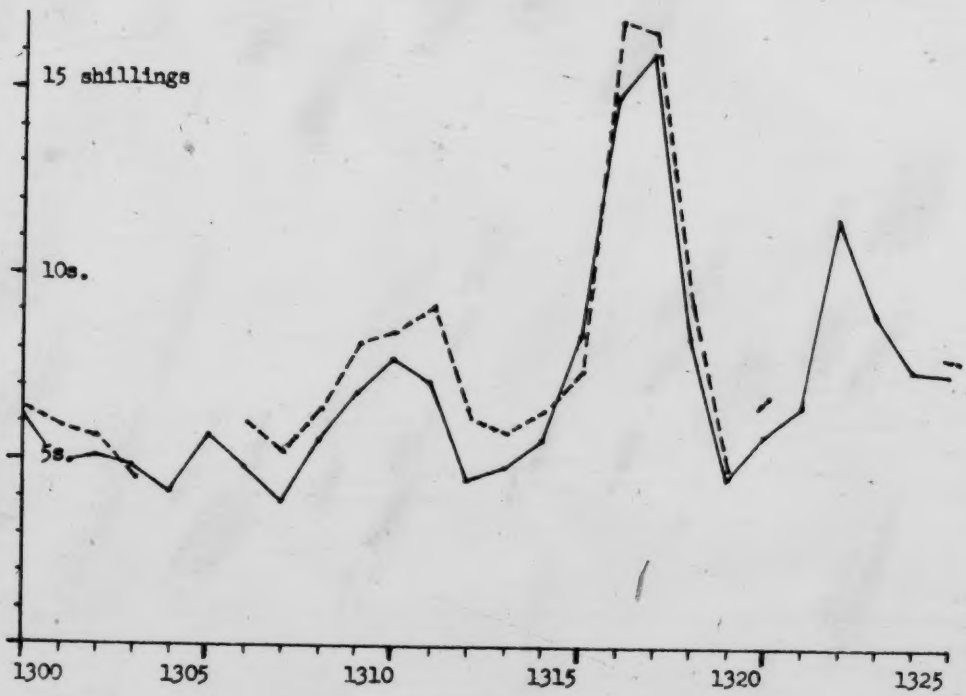

Fig. 1. *Wheat Prices of the First Quarter of the Fourteenth Century Illustrating the Famine as a Three-Wave Crisis.* Rogers's prices are indicated by the solid black line and Titow's prices are indicated by the broken line. It must be remembered that each year's prices are a reflection mostly of the previous year's harvest, although towards the end of a year the prices may in some instances have been modified somewhat by the anticipated quality of the coming harvest, which would affect the year's average slightly.

The summer of 1310 was a normal dry summer but the harvest was nevertheless an exceedingly dismal one. In his study Titow noted the

occurrence in a number of instances of harvest failures that appear to have resulted from wetness in the autumn of the year preceding even though the summer was satisfactory.[58] 1310 was one of these instances.[59]

From the 1310 harvest to that of 1313 normal conditions seem to have prevailed, according to the account rolls. The summers in that period were a little on the dry side, if anything.[60] There are, however, two isolated references, one under the autumn of 1310, and the other under the autumn of 1311, to expenses on account of "the fear of rain."[61] One can only speculate as to the cause of these fears, whether the experience of the previous year or years had left an uneasiness in the minds of the people, or whether the autumns in question had started out rainy but had not continued so.

Trouble returned with the autumn of 1313, which was "very wet and long"[62] and the following winter was a hard one--there is reference to "very great frost and snow (*maximum gelu et nivem*)."[63] There is no reference to the summer of 1314, but the fall of that year was also "very wet and long" and with instances of flooding.[64] The evidence is conflicting as to the quality of the 1314 harvest, although it seems that the rain began too late to do real damage. We are left with the picture given by the author of the *Vita Edwardi Secundi* of people struggling in mud and in heavy rain to bring in the harvest, which appears to be an accurate one.[65] And from then until about the middle of 1317[66] there is mention of flooding in every season of every year.

Since there were floods all the time during those three years, there was most certainly also a lot of rain. However, the account rolls contain no direct information about rainfall for some seasons,

and only the following seasons are explicitly described as excessively rainy: the summer of 1315 and the autumn of the same year. There is a statement under the year 1316 remarking on "the great unsuitability of the summer weather (*magnam incongruitatem temporis in estate*)"[67] and it would not be unreasonable to assume that this, too, is a reference to excessive rainfall. The chronicles leave no doubt that these were years of unprecedented rainfall, but Titow's records do not allow us to make more precise statements than the above about specific seasons.

The next season described in detail in the manorial accounts is the very dry summer of 1318, a summer that led to a very good harvest. The harvest of 1318 was welcomed with sighs of relief by a number of chroniclers, as has been shown, but the manorial accounts indicate that the relief may have been short-lived. It appears that the rains returned again with renewed vigour, either in the late autumn of 1318 or in the first part of the following winter, because flooding was once more reported in the winter of 1318/1319. As the 1319 accounting year began with rain, so did it continue, according to Titow's evidence. There is a reference from one manor that describes the summer as having "rainy weather" (*tempus pluviosum*)[68] and for lack of other evidence Titow describes the summer as "wet?"[69] But there is no doubt, apparently, about the autumn conditions, for a number of manors describe the autumn weather as very rainy, and one manor uses the term "exceedingly rainy" (*tempus pluviosum nimis*).[70] Titow has no information about the 1319 harvest but Roger's price averages make it clear that it was poor enough to reverse the trend of falling prices that was brought about by the good harvest in 1318.

The winter of 1319/1320 is not covered by the documents and there are no weather references for the summer of 1320--which suggests that it was a normal dry summer. The autumn, however, was definitely wet once again and there are renewed references to "exceedingly rainy weather."[71] It is perhaps the rainy autumn that was the principal cause of the harvest failure of the following year, 1321, because there is no reference to unusual conditions in 1321. The winter of 1320/1321 passed without observations of any kind in the accounts, and the summer of 1321 is described as probably on the dry side, which is the most favourable kind of summer for wheat-growing in England.[72] Similarly, the autumn must have been fairly normal, if one goes by Titow's evidence, since there is no reference to unusual fall weather conditions.

There is no documentary evidence at all for the years 1322 and 1323, nor is there any for the first part of 1324, including the summer. The autumn of 1324, however, appears to have been rainy, for one manor reports rainy weather for the autumn and there is flooding reported for the following winter. It seems that after the year 1318 there was a new annual weather pattern that began with that year, one of dry summers followed by wet autumns, and that 1324 probably followed that pattern. After 1324, however, the wet period seems to have ended completely for a time. The summer of 1325 was dry as was the following winter. Again, there were a number of complaints of drought for the summer of 1326, but the harvest was bountiful, as it had been in 1325, giving the impression that the dryness was more unpleasant than economically damaging.[73]

This, then, is the picture that emerges from the evidence supplied by Titow. Examined in the light of the chronicle accounts, it is a picture that is as accurate and detailed as it is possible to construct from published medieval documents alone. But Titow was aware that it was possible to go beyond documents, and in his article he made reference to a pioneering dendrochronological study, the results of which had been published in 1959,[74] which he said showed "striking agreement" with the manorial records with respect to extreme years.[75] This study merits detailed consideration here, both because of the historiographical significance of the science of dendrochronology and because it adds important information to the existing knowledge of the years of the Agrarian Crisis. The article, published by D. Justin Schove and A.W.G. Lowther in the journal *Medieval Archaeology*, presented first a short explanation of the history and methodology of the research method involved and then summarized the findings from some tree-ring chronologies that had been assembled from English oak specimens.

Briefly, dendrochronology involves the examination of tree-ring widths. If the date at which a tree was cut down is known, each annual ring can be dated, and if the annual ring-widths are plotted on a graph the distinctive pattern of wide and narrow rings that are formed will be repeated in the ring-width graphs of other trees that overlap chronologically with that tree. In this way trees can be dated relative to each other and collectively they can be made to form chronologies extending over long periods.[76] Furthermore, on the basis of the belief that the width of an annual ring is greatly dependent on the

climatic conditions of the year in which it was formed, especially the amount of rainfall,[77] climatic conclusions have been drawn from these ring widths.

In the paper by Schove and Lowther three "floating chronologies" are discussed, one for the Roman period, one for the Anglo-Saxon period and one covering the period from c. 850 to c. 1500 A.D. A floating chronology is a graph of calibrated tree-ring widths from trees which have been dated relative to each other but not dated in absolute terms because the chronology has not been made to overlap with modern graphs from trees whose date of felling is known. A chronology that is extended to the present by means of tree rings alone is termed an absolute chronology.[78] In all other cases it is necessary to date the chronology by non-dendrochronological means, such as dating archaeologically the building from which tree-ring samples were taken in situations where the timbers had been part of a building,[79] or by matching the tree-ring widths with known meteorological facts derived from other sources; for example, Schove's and Lowther's medieval chronology was dated by matching the extremely narrow rings with droughts that were severe enough to be mentioned in the chronicles.[80]

When dated in this manner, Schove's and Lowther's medieval chronology was found to extend to the year 1480,[81] and "in the period 1188 to 1363, each year was represented on three or more specimens, and the cross-dating could be proved rigorously."[82] Schove and Lowther also describe briefly some of the meteorological indications which this chronology gives, although they do not present the chronology graphically, publishing the actual curves.[83] Nevertheless, their description

has two points of interest that have a real bearing on the study of the Agrarian Crisis.

The first of these occurs in the article's list of "maxima" or very wide rings, rings which appear to mark years of heavy precipitation. In the first quarter of the fourteenth century only the year 1309 appears in this list. This does not mean that this is necessarily the wettest year in the period 1300 to 1325, since a tree responds physiologically to previous conditions--especially the preceding year's conditions--and by the time the exceedingly wet years of 1315 and 1316 came along, the trees would have adjusted somewhat to wet conditions already.

The tree samples that Schove and Lowther worked with were from what they called "drought-sensitive" oaks, meaning, in effect, that the narrow rings were more significant as climatic indicators than the wide ones. This is partly because false maxima were caused in a number of instances by the occurrence of a drought in the year immediately preceding that of the maximum. The maxima would thus be caused to a great extent by the trees' adjustment creating an illusion of greater wetness than there actually was. Incidentally, this drought sensitivity does not work nearly as strongly in reverse and there is no pattern of exaggeratedly narrow bands immediately following extremely wet years. These adjustments, it should be pointed out, do not negate the fact that, generally speaking, a wide tree ring indicates a wet year and a narrow one a dry year, since the physiological adjustments constitute only one factor affecting the widths, but it does prevent us from concluding, for instance, that a tree ring twice as wide as another necessarily represents a year that is twice as wet.[84]

The 1309 maximum, however, is not preceded by a narrow band,[85] and therefore seems to be a good indication of excessive wetness that year. Titow's evidence as well gives no indication of drought or anything approaching it in 1308, and the trees used by Schove and Lowther can be said to reflect the same general area as that reflected in the information from the Winchester accounts.[86] The result is that there is here additional evidence to suggest that the first wave of the Agrarian Crisis was far more impressive than has been indicated by historians so far. The unusual wetness of 1309, which appears to have been a significant causal factor in the harvest failure of 1310,[87] was a full-blown manifestation of the kind of meteorological conditions that provoked the famine five years later.

The second point of interest occurs in the list of tree-ring minima, that is, the list of drought years. Surprisingly, there is here a rather noticeable contradiction of Titow's picture, for 1319 appears as the only minimum for the first quarter of the fourteenth century.[88] Again, because of the physiological adjustment, this does not suggest that 1319 was drier than 1325 or 1326, but it does suggest that 1319 was a very dry year and, by implication, a warm sunny one.[89] And it should be noted that this is exactly the kind of summer that is considered conducive to the formation of toxic algae blooms which, it will be argued in the next chapter, may have been one of the major causes of the animal mortality of that year. On the basis of one manor's report of rainy weather for that summer, Titow described it as "wet?," but the tree-ring study makes it clear that the emphasis must be on the question mark.

It is possible that the contradiction may be due simply to the existence of substantial variation in the weather from place to place within England that year, but it is also possible that either Titow's evidence or that presented by Schove and Lowther has been erroneously interpreted. Both have a certain reliability, but both contain risks of error as well: the medieval accountant who reported rainy weather may have been exaggerating a little wetness in his area in order to excuse some negligence on his part, and the 1319 tree-rings may all have been narrow because each tree was coincidentally defoliated by caterpillars that year.[90] The safest conclusion is that the weather conditions in 1319 are as yet unknown, and that additional information is needed before a reliable conclusion can be drawn.

Since Schove's and Lowther's article there has not appeared any dendrochronological studies which present chronologies for the Middle Ages prior to 1327 A.D.[91] While England is definitely a world leader in paleoclimatological research, the country has relied little on dendroclimatology to reconstruct its own climatic history. English tree-ring researchers, principal among them J.M. Fletcher,[92] have tended to concentrate almost exclusively on developing the theoretical foundations of dentroclimatology as a science rather than on its application.[93] In Germany, however, there has been a great deal of work done on tree-rings from sessile oaks[94] and a master chronology has been developed which extends from the year 800 A.D. to the present. Climatic information has been derived from this chronology for the period of the Agrarian Crisis in Germany. Also, it has been noted that correspondences exist between German oak chronologies and chronologies from

considerably distant places, such as Normandy in France.[95] Hence, it is not unreasonable to expect that the climatic information derived from them may have some applicability to England, although an exact year-to-year correlation is certainly not to be expected. Emmanuel Le Roy Ladurie has examined the above-mentioned master chronology for Germany closely and his conclusions with respect to the Agrarian Crisis is clearly summarized in the following passage:

> One often meets with wide tree rings which in their time were steeped in water, and which correspond to wet years or series of years noted for floods in the chronicles of the Middle Ages or the seventeenth century. This is probably true of the year 1673 and the decade beginning in 1690. It is certainly true of the decade 1310, or more exactly the years 1312 to 1319. On the dozens of trees examined by Huber and his team, these eight years are characterized by very wide rings, in marked contrast to the preceding periods (before 1312) and those which followed (after 1319).[96]

Although it appears from the chronicle evidence, and other sources, that the extreme wetness in England began a little earlier and ended a little earlier than the tree rings indicate that it did in Germany, this tree-ring evidence for the wetness of almost the whole decade is significant confirmation of the reality and of the duration of the unusual weather conditions that have been credited with causing the Agrarian Crisis, and this is especially so because the evidence is independent and does not come from written sources.

As far as paleoclimatology is concerned, however, it is the understanding of climatic change in its general, or long-term, sense that has benefitted most from tree-ring studies. Much light has indeed been thrown on specific decades and sequences of years, but the information of this kind pales into insignificance before the almost

stunning revelations of a general nature that tree-ring research has produced. It was through carbon dating individual rings of the bristlecone pine, for example, that real long-term confirmation was found for the growing belief that the solar constant was in fact inconstant, and that this inconstancy reflected climatic change.[97] H.E. Suess, working in California, began publishing his carbon-dating data in 1967,[98] although a pioneering study of this kind had already appeared in Europe as early as 1960.[99] Suess was able to extend his tree-ring data as far back as 5300 B.C. because of the incredible life span of the bristlecone pine, the oldest living specimen of which was found to be 4900 years old.[100] At the same time research was coming out which indicated that observed sunspot activity reflected variations in the intensity of the solar beam as well, and that sunspot activity could also be taken as an indicator of climatic variations.[101] This belief, too, found confirmation in the ^{14}C-isotope analysis of the bristlecone pine,[102] and in Dansgaard's ^{18}O-isotope analysis of the ice cores at Camp Century.[103]

It was found, for instance, that the period of unusual climatic warmth that began in the last century and reached its peak during the first part of this century matched a period of unusual sunspot activity,[104] and that conversely, the period of the Little Ice Age was a period of almost no observed sunspots, especially from circa 1645 to 1720, a period that has been named the "Maunder Minimum."[105] Another period of minimal sunspot activity, known as the "medieval minimum,"[106] occurred in the period extending roughly from 1290 to 1350,[107] although it was not as pronounced a minimum as the Maunder minimum. The evidence

for sunspot activity in the medieval period, or the lack of it, is based primarily on the excellent Chinese records, but this information has been augmented by compilations of aurora observations found in European chronicles,[108] since auroras are causally related to sunspots.

In the same way volcanic activity has been said to occur in cycles that coincide with the sunspot cycles,[109] and therefore also with patterns of climatic variation.[110] While the correlation between periods of increased volcanic activity and sunspot cycles is still controversial,[111] the relationship between periods of increased volcanic activity and periods of climatic cooling have long been recognized. No causal relationship has been recognized, however, and at present these two factors are regarded simply as unexplainably coincident.[112] Originally it was believed that the volcanic activity might have been the principal cause in a number of climatic deteriorations through history, including some of the ice ages, but this theory has been greatly weakened by evidence that indicates that the surge of volcanic activity has tended to take place well after the climatic cooling has begun.[113] Indeed, the argument has been advanced, although inconclusively, that the climatic cooling is the cause of the volcanic activity.[114]

This correlation between volcanic cycles and periods of climatic deterioration has a special relevance to the period of the Agrarian Crisis, and this for two reasons. First, regardless of which is the original cause of which, or whether they are even causally related, it is generally recognized that volcanic eruptions are capable of significantly aggravating a period of already cool climate for a relatively

short period.[115] In fact it has been estimated that a single volcanic eruption can inject sufficient quantities of fine dust particles into the stratosphere that the resultant filtering of solar energy will cause markedly cooler temperatures throughout an entire hemisphere for three to four years afterwards.[116] John D. Post, for example, considers that the "meteorological catastrophe" of 1812-1817, to use his words, was caused by "abnormally high volcanic activity" at that time.[117] It is worth examining the possibility that volcanic activity might have been similarly involved in the period of the Agrarian Crisis. Secondly, that possibility is especially intriguing because it would give certain otherwise miscellaneous chronicle passages value as evidence.

In the Tintern version of the *Flores Historiarum* the following passage occurs under the year 1317:

> On the Feast of the Holy Trinity, and on the day after, the sun showed itself in the colour of blood, so that it could always be seen both days, but it did not give off its splendour over the earth.[118]

And in *The Chronicle of Lanercost*, during a description of the solar eclipse of 1312, the greenish colour of the sun is remarked upon.[119]

H.H. Lamb explains the effect of volcanic eruptions on the appearance of the sun in these words, which corresponds admirably to the Tintern chronicler's description:

> The presence of the denser volcanic dust veils is readily apparent to the eye, through the dimming and reddening of the sun and through the white glare from the sky near the sun, which becomes fiery red at sunrise and sunset, as well as from the hazy white or dull, leaden appearance of the rest of the sky.[120]

As Lamb points out, however, volcanic dust can alter the sun's hue in a number of ways, sometimes even giving it a greenish appearance,[121]

and Peter Francis, in his book *Volcanoes*, cites a description of the sun seen from Ceylon following the famous 1883 eruption of Krakatoa in which the sun had a "splendid green" colour.[122]

Could the 1300s, especially the early 1300s, have been years of high volcanic activity? H.H. Lamb has made a study of recent periods of volcanic activity, assembling data on volcanic eruptions from all over the world and attempting to rate these eruptions in terms of their power and climatic consequences.[123] He found, for example, that the century and a half from 1750 to 1900 was a period of exceptional volcanic activity that stood out from the rest of modern times.[124] There were also lesser peaks of volcanic activity, such as one in the second half of the sixteenth century,[125] but Lamb's research only extended as far back as the year 1500 A.D. This was probably because the records are not as full for the period before 1500, especially in non-European areas. Nevertheless, there is a good basis for advancing the hypothesis that the fourteenth century as a whole was a time of greater-than-usual volcanic activity.

The century began with a massive eruption of Mt. Hekla in 1300, after it had erupted six years earlier in 1294.[126] In 1302 the volcanic island of Ischia in the Bay of Naples erupted for what appears to have been the last time.[127] It, too, was probably a powerful eruption.[128] There is evidence for an eruption of Mt. Vesuvius in 1306.[129] Mt. Etna experienced an eruption in 1329 that has been termed one of its "disastrous eruptions."[130] Mt. Hekla erupted again in 1341[131] and Mt. Etna erupted again in 1381.[132] In 1362 Iceland experienced the eruption of Öraefi, an eruption "which produced the greatest ash layer

since the human settlement of the island."[133] In 1372 an unnamed crater erupted in Iceland, also a final eruption,[134] and in 1389 the island experienced two eruptions: another by Mt. Hekla[135] and a prolonged fissure eruption by Trölladyngja.[136]

This hypothesis is further supported by the circumstantial evidence of the unusual number of earthquakes which the medieval sources record. Earthquakes and volcanic activity are both results of a common cause--tectonic shifts in the earth's crust,[137] and it is to be expected that they would occur in coincident waves. This coincidence has been remarked upon by John Gribbin, who notes the "global synchronicity in earthquake and volcanic activity outbursts."[138] The fourteenth century was unusual for England in this respect. Being quite distant from the real danger areas for earthquakes, England rarely experiences them. But in the fourteenth century earthquakes were recorded in the years 1318,[139] 1320,[140] 1348,[141] and 1382.[142] It should also be mentioned that Italy experienced a particularly severe earthquake in 1348[143] and that China was unusually plagued by earthquakes from 1324 to 1345.[144]

The above evidence for a period of increased volcanic activity, the result of a cursory examination of some basic texts on volcanoes, certainly is not sufficient to constitute proof of any kind, since it is above all fragmentary and incomplete. But it is an indication that future research may eventually prove that the fourteenth century was exceptional in this way. As relevant chronicle passages and other evidence are increasingly being compiled and collated by scientists, a more accurate picture is likely to emerge in the near future. For the present, however, the rough picture presented above is the best

available, and the fact that the cursory examination obtained significantly fewer instances of volcanic eruptions in the preceding and subsequent centuries fairly strongly suggests that the fourteenth century was exceptional in this way.

It can be seen, then, that while the state of research into the meteorological conditions of the past is a rapidly developing field of research that is only at the beginning of its promise, there is already sufficient increase in our understanding of fourteenth-century conditions to enable us to substantially modify our picture of the Agrarian Crisis. It is now quite evidently a sixteen-year event that began with the year 1309 and lasted until 1324, covering almost the whole of Edward II's reign. It came in three waves, which peaked in 1310, 1316, and 1321, respectively.

The discomfort of the time involved cold as well as wetness, which extended even beyond those years, for it has been convincingly demonstrated by meteorologists and climatologists that the beginning years of the fourteenth century were a period of climatic change. The long-term climatic deterioration that marked the late Middle Ages began with gradual and almost imperceptible deterioration in the climate even before 1300, but in the second decade of that century it became a marked and dramatic change. And while the deterioration lasted at least a century and a half in its first phase, it appears that the first half of this period involved special additional factors, including a period of somewhat diminished solar intensity and, perhaps, a period of unusual volcanic activity.

That is how the new research into paleoclimatology has affected the understanding of the period of the Agrarian Crisis. It has had another equally significant effect on the study of this period, and that is a historiographical one. The new research constitutes a source of evidence that is independent of the written records and is therefore a valuable means for the historian to check those records. The importance of this non-written evidence, which paleoclimatologists call "proxy data" is well summarized in these words by H.H. Lamb:

> In recent years. . . . new techniques have provided new types of evidence--particularly measurements of the stable isotopes of oxygen, carbon, etc., in ice sheets, tree rings, lake sediments and other materials, and multivariate analysis of the responses to climate registered in such items--which, whatever the difficulties and uncertainties of interpreting such proxy data, are independent of the works of Man and of human bias in reporting.[145]

The evidence that this research has brought forth concerning the period of the Agrarian Crisis has, on the whole, tended to confirm the reliability of the chroniclers. They omitted much, but what they recorded generally fits well with the overall picture presented by the proxy data.

But the significance of paleoclimatology to the study of chroniclers goes even further. That evidence which is "independent of Man" has its limitations as well, and paleoclimatologists have worked assiduously to gather relevant chronicle passages of all kinds, from weather observations to notes on the colour of the sun, in order to aid them in their interpretations. Recently an article on paleoclimatology encouraged scientists to learn the fundamentals of textual criticism in order to be able to deal adequately with medieval sources.[146]

Perhaps historians should respond to this need themselves by dealing adequately with these neglected chronicle passages.

NOTES TO CHAPTER THREE

[1] *Chronicon Angliae Petriburgense*, p. 160: "*Ex multa inundatione aestivalium in pluviarum, facta est fames valida, frugibus ubique pereuntibus.*"

[2] Rogers, *History of Prices*, vol. 1, p. 198, has this to say of 1315 and 1316: "It will be found that the scarcity was not local but universal, the whole country having been similarly affected. Nor will any parallel, it may be asserted confidently, be discovered for these two years. . . . The highest quotation of wheat in modern English history is that of December 1800, when it is returned at £6 13s. 4d. This, however was not much more than double the ordinary price, while the scarcity of 1315 represents a quintuple rise in many places, and that of 1316 almost a quadruple of the general average."

[3] Lucas, "The Great European Famine," pp. 345-346.

[4] Kershaw, "Agrarian Crisis," p. 6.

[5] *The Chronicle of St. Mary's Abbey, York*, ed. by H.H.E. Craster and M.E. Thornton, Surtees Society, vol. 148 (Durham: Andrews & Co., 1931), p. 38: "*Eodem anno a die sancti Michaelis per XV menses fuerunt frequentes pluvie fere per totam Angliam.*"

[6] Gustav Utterström, "Climatic Fluctuations and Population Problems in Early Modern History," *Scandinavian Economic History Review*, vol. 3, no. 1 (1955), pp. 3-47.

[7] Ibid., pp. 4, 14.

[8] Ibid., pp. 3-4.

[9] Ibid., pp. 5-9.

[10] Ibid.

[11] Ibid., p. 21.

[12] Ibid., pp. 9-10. Utterström relies for this information on George Kimble, *The Weather* (Harmondsworth, England: Penguin Books, 1954) and *An Historical Geography of England, A.D. 1000-1250*, ed. by H.C. Darby (C.U.P., 1951). The best and most up-to-date summary of this question is in Lamb, *Climate: Present, Past and Future*, vol. 2, pp. 276-279, 435-436. See also H.H. Lamb, *The Changing Climate* (London: Methuen & Co., 1966), p. 7, where the matter is encapsulated as follows: "In Domesday Book (1085) 38 vineyards were recorded in England besides those of the king. The wine was considered almost equal with the French wine both in quantity and quality as far north as Gloucestershire and the Ledbury area of Herefordshire where the soil is said to resemble that of the Rhine and Moselle wine districts. The London basin, the Medway valley and the Isle of Ely were also favoured districts. The northernmost vineyards were near York but the most favoured country was from Northants to the Fenland southwards. This implies summer temperatures perhaps 1 to 2° C higher than today, general freedom from May frosts (particularly suggested by the exposure to the north of several low-lying vineyard sites, e.g. at Tewkesbury, in the Fens and at Teynham, Kent) and mostly good Septembers." And on p. 10 he writes further that the decline of vine-growing "in England, perhaps mainly between 1250-1400, seems to fit better with the time of climatic deterioration than with the increase of competition with the French wines: trade must have expanded considerably after the accession of the Garonne to the English crown in 1152, yet many English vineyards were established after that date."

[13] Utterström, "Climatic Fluctuations," p. 17.

[14] Utterström, ibid., cites M.M. Postan, "*Die wirtschaftlichen Grundlagen der mittelalterlichen Gesellschaft*," *Jahrbücher für Nationalökonomie und Statistik*, vol. 166 (1954), pp. 180-205, as dating the period of hard weather and bad harvests as stretching from 1309 to 1323, and he states that Postan "accepts it as obvious that agricultural depression in England, France and Germany in the 14th century was ushered in by torrential rains and floods in 1309-1323." It should be noted here that the term "ushered in" is used very deliberately to avoid making any statement about causation. This because Postan does not consider it to be in any way proven that the climatic deterioration had any significant human consequences, and also because he does not consider that the crop failures of the second decade of the fourteenth century could have had any long-term consequences, such as a two-century economic depression without more profound and important causes being at work. See the English version of Postan's article, "The Economic Foundations of Medieval Society," *Essays on Medieval Agriculture and General Problems of the Medieval Economy* (C.U.P., 1973), p. 13.

[15] *Flores*, vol. 3, p. 328.

[16] *Chronicle of St. Mary's*, pp. 39-40.

[17] C.E.P. Brooks, *Climate through the Ages*, 2nd rev. ed. (n.p.: Ernest Benn, 1949: reprint ed., New York: Dover Publications, 1970).

[18] Leonard S. Higgins, "An Investigation of the Problem of the Sand Dune Areas on the South Wales Coast," *Archaeologia Cambrensis*, June 1933, pp. 31-34, 64. See also Brooks, *Climate*, pp. 311-312.

[19] Axel Steensberg, "Archaeological Dating of the Climatic Change in North Europe about A.D. 1300," *Nature*, vol. 163, no. 4277 (20 October 1950), pp. 673-674. Palynology, the study of pollens and spores, has been very effectively applied to the study of climate. The method used was developed as early as 1918 but it was only after the Second World War that its application became widespread. It involves the microscopic examination of pollen grains and spores found in dated soil layers, especially those of peat bogs and lake deposits. Since these pollen grains are practically indestructible and since they are sufficiently characteristic to enable the botanist to identify the tree or plant from which they came, conclusions can be drawn from them about the vegetation in an area at a specific time in the past, and since the advances or retreat of certain kinds of vegetation, both in degrees of latitude, or in feet of altitude, is greatly dependent upon moisture and temperature, these conclusions reflect the climate of the time as well. Pollen analysis has been used in medieval archaeology in isolated instances. So far, however, I have not found any studies of this kind focussing on fourteenth-century England. The leading authority in English palynological research is Harry Godwin, who has recently published a comprehensive work entitled *A History of the British Flora*, 2nd ed. (C.U.P.).

[20] Steensberg, "Archaeological Dating," p. 673.

[21] Perhaps this may be partly due to the renewed climatic deterioration that is considered to have begun in our own time. Lamb dates the beginning of this deterioration to about 1960 (*Climate: Present, Past and Future*, vol. 2, p. 540).

[22] The literature that deals with the paleoclimatology of the historical period is expanding by leaps and bounds and I will content myself with citing some of the more generally useful works here. The most comprehensive work written by an historian on this subject is Emmanuel Le Roy Ladurie's *Times of Feast, Times of Famine: A History of Climate since the Year 1000*, trans. by Barbara Bray (Garden City, New York: Doubleday & Co., 1971) which should be read with John D. Post's balancing review of the book, "Meteorological Historiography," *Journal of Interdisciplinary History*, vol. 3, no. 4 (Spring 1973), pp. 721-732. From the point of view of the scientist the most

important work of synthesizing the results of climate research from around the world is that of H.H. Lamb, the director of England's Climatic Research Unit. Three of his works stand out: *The English Climate* (London: The English Universities Press, 1964) which explains the English climate in terms comprehensible to the non-meteorologist; *The Changing Climate* (London: Methuen & Co., 1966) which is presently the best starting point for the person interested in English paleoclimatology; and finally the all-encompassing *Climate: Present, Past and Future*, 2 vols. (London: Methuen & Co., 1972, 1977).

[23] In 1937 C.E. Britton assembled a list of weather references in English chronicle accounts (*A Meteorological Chronology to A.D. 1450*, Meteorological Office Geophysical Memoirs, no. 70 [London: 1937]). If the references that it contains for the period of the Agrarian Crisis are any indication, it is certainly not exhaustive, and there are many chronicle references in this thesis that are not found in Britton.

[24] Lamb. *Climate: Present, Past and Future*, vol. 2, p. 449.

[25] Ibid., p. 348.

[26] For example, ibid., pp. 360, 429, 451.

[27] Ibid., p. 449. Lamb also adds that "physical scientists tend to avoid such words, which confuse the climatic event with its consequences in the biological realm. Moreover no climatic shift is likely to be either good or bad for all people, or all purposes, everywhere. But this particular climatic change probably was a change for the worse for most people in most places."

Lamb treats the climatic deterioration of the fourteenth century as a separate phase from "The Little Ice Age" which was a much colder period that set in roughly around the beginning of the seventeenth century. A number of writers on the subject, however, include the fourteenth-century cooling under the term "Little Ice Age" and regard it merely as the first phase of that event (Post, "Meteorological Historiography," p. 722).

[28] Lamb, *Climate: Present, Past and Future*, vol. 2, p. 449.

[29] Ibid. Lamb speaks here of "shifts of the zones of most cyclonic activity" which is synonymous with the term "depression tracks" as it is used in his description of the deterioration in *The Changing Climate*, p. 8.

[30] Ibid., pp. 448-449. Lamb also points out that with the increase in cold after about 1300 there would have been a general decrease in evaporation, causing water to stay longer on the ground.

[31] Lamb, *The Changing Climate*, p. 8. See also W. Dansgaard, S.J. Johnsen, N. Reeh, N. Gundestrup, H.B. Clausen, and C.U. Hammer, "Climatic Changes, Norsement and Modern Man," *Nature*, vol. 255, no. 5503 (1 May 1975), pp. 26-27, for further discussion of the time delay.

[32] Le Roy Ladurie, *Times of Feast, Times of Famine*, pp. 48, 86-89, 103-104, 228, 257, 296-305, shows that there is a high degree of correlation among paleoclimatological data from widely dispersed areas of the world. The correlation is best when long-term trends are dealt with and it is also better among data dealing with just the northern hemisphere, although the correlations do indicate that the long-term climatic variations tend to be part of changes that are global in scope. This is certainly the case for the fourteenth-century deterioration. (See Lamb, *Climate: Present, Past and Future*, vol. 2, pp. 100, 348, 435, 449.)

Nevertheless, there are some surprisingly good short-term correlations. The tree-rings of the bristlecone pines in the White Mountains of California, reflecting temperature patterns rather than moisture patterns, show a climatic cooling beginning around 1300 (Valmore C. LaMarche, Jr., "Tree-ring Evidence of Past Climatic Variability," *Nature*, vol. 276, Climatology Supplement [23 November 1978], p. 337).

Another good short-term correlation is of particular interest for the years of the Agrarian Crisis. It is with the almost exactly similar series of events to those in Europe which occurred in China in the second decade of the fourteenth century. Creighton, *Epidemics in Britain*, vol. 1, pp. 151-153, points out that the years 1308, 1313, 1315, 1318, 1321 and 1324-1327 were exceedingly bad years in China, years of either drought or excessive rain and flooding (sometimes both in different places) as well as famine and pestilence. China, too, experienced earthquake during this period, in 1324, to be precise. For his information on China in this instance Creighton is quoting De Mailla, *Histoire générale de la Chine*, 9 vols. (Paris, 1777).

[33] See note 31. The Greenland Ice Sheet Program is involved in researching, among other things, the history of Greenland temperatures and their implications for the rest of the world, through isotope analysis of ice cores. In the ice cores that are drilled the layers of annual accumulation are visible and can be counted to obtain the date of each layer. Each layer is then analysed for the presence of the heavy oxygen isotope, ^{18}O, and the variations are taken as an incidation of relative temperature since a smaller proportion of ^{18}O is present in precipitation as $H_2{}^{18}O$ the colder the temperature at which condensation took place.

[34] Dansgaard, "Climatic Changes," p. 26.

[35] More precisely, the English series is based on Lamb's *The Changing Climate*, ch. 7.

[36] Lamb, *Climate: Present, Past and Future*, vol. 2, pp. 440-446.

[37] This is the impression that the chronicle accounts give, and it is confirmed by Lamb's summer wetness/dryness and winter severity/mildness indices. See *Climate: Present, Past and Future*, vol. 2, pp. 440, 562-565.

[38] H.H. Lamb, "Britain's Changing Climate," *The Biological Significance of Climatic Change in Britain*, ed. by C.G. Johnson and L.P. Smith, Symposia of the Institute of Biology, no. 14 (London: Institute of Biology, 1965), p. 7.

[39] Lamb, *Climate: Present, Past and Future*, vol. 2, p. 454. This is not to say that there were no manifestations of the cooling in Europe itself before 1300, but only to say that the climatic change became very noticeable and pronounced about that year. Periods of climatic cooling are periods of greater climatic instability (Reid A. Bryson, *World Climate and World Food Systems III: The Lessons of Climatic History*, Institute of Environmental Studies Report 27 [Madison, Wisconsin: University of Wisconsin, November 1974], p. 6) and this seems to have manifested itself in England before 1300 in increased storminess (Brooks, *Climate through the Ages*, pp. 303, 306). Perhaps, too, the bad harvests of 1289 and 1290, which appear to have been caused by a combination of wet winters and very dry summers, may be regarded as something of a preview of things to come. Lamb characterized the years from 1200 to 1400 as a time "of remarkable climatic instability in western Europe with great floods and droughts, notably severe and notably mild winters" (*The Changing Climate*, p. 7) and it should also be mentioned that the glacial advances in the Alps have now been found to have begun already in the thirteenth century (Le Roy Ladurie, *Times of Feast, Times of Famine*, p. 252).

Some of the evidence for thirteenth-century storms may be misleading, however. Many of these were sea storms which had a strong impact because of the sea-floods that they caused along low-lying coasts. To a great extent the floods were a factor of the high sea level which prevailed at the time and which is characteristic of warm climatic episodes (Lamb, *Climate: Present, Past and Future*, vol. 2, pp. 111-129, 432-434).

[40] John Titow, "Evidence of Weather in the Account Rolls of the Bishopric of Winchester," *Econ. Hist. Rev.*, 2nd ser., vol. 12, no. 3 (1960), p. 360, states that this evidence is superior to that found in the chronicles since the accounts "were recorded by men on the spot in the same year to which they relate and are free of the chroniclers' colourful exaggerations and retrospective inaccuracies." There is a great deal of truth in this, but at the same time it must be borne in mind, as Titow himself admits, that most of the weather references in the account rolls are incidental and are included simply to justify expenditures, such as excessive plough repairs caused by abnormally dry

weather, or to excuse poor returns. Thus they are often references to rather short periods of unusual meteorological activity, say as little as two or three weeks, and they do not have, or even attempt to have, the longer perspective of a chronicler, who would be more concerned with giving an impression that encompasses a whole year, or series of years.

[41] Le Roy Ladurie, *Times of Feast, Times of Famine*, p. 45.

[42] Ibid.

[43] Le Roy Ladurie referred to "thirty-two seasons" when he spoke of the eight years in question, but this does, to a certain extent, mislead the reader with respect to Titow's study. For each year Titow lists weather observations under three headings: "winter, summer, and autumn." This is because the account rolls do not contain references to spring but appear to include all spring references under the winter heading. During the eight year period there is only one wet winter that is not followed by a wet summer, so I have, in effect, counted each of these winters as two seasons, winter and spring, and my figure of nineteen wet seasons will not be too far out under any circumstances.

[44] Le Roy Ladurie, *Times of Feast, Times of Famine*, p. 45.

[45] Ibid., pp. 45-47. Le Roy Ladurie refers to the famine period in Europe as "the wet years" or "the wet decade," dating it roughly from 1310 to 1320, although he is quite ambivalent and sometimes dates it from 1313.

[46] Lamb, *The Changing Climate*, p. 8.

[47] Norman Scott Brien Gras, *The Evolution of the English Corn Market*, Harvard Economic Studies, vol. 13 (Cambridge, Mass.: Harvard University Press, 1926), pp. 42-46, shows that England was divided into some fifteen local market areas as far as grains were concerned, and each district had a "strong tendency towards a differential price level." This conclusion is based upon the price materials in the second volume of Rogers's price study. The implication of this conclusion is that each market area is affected mainly by the conditions prevailing within the area and not by external conditions.

It is also interesting to note that Gras found that the area which he calls the "lower Thames area" and which contains the city of London and its immediate environs generally had markedly higher prices than its neighbouring areas (p. 44). This would account in part for the exaggerated prices quoted in the chronicles.

[48] Titow, "Evidence of Weather," p. 362.

[49] The harvests of 1315 and 1316 are undeniably the worst harvests of the medieval period, but besides those two, and the other bad harvests of the Agrarian Crisis, the period 1200-1350 contains a number of other very had harvests: 1224, 1226, 1283, 1290, 1339, 1343, 1346, 1349 and 1350 (Titow, "Evidence of Weather," p. 364).

[50] Titow uses the harvest year because the accounts are based on it, but it is quite evident that he has advanced every date one year ahead so that they will correspond more closely with the calendar year as it is reckoned today. The most extraordinary aspect of this adjustment of the dates is that Titow does not mention that he has done this! However, for the purpose of comparison I have done the same thing with Rogers's dates and constructed a graph comparing them (see fig. 1, p. 128). The high degree of correspondence is, I think, conclusive proof that Titow has manipulated the harvest year in this fashion--unless, of course, all of the Winchester manors were one year out of phase with the rest of medieval England.

[51] Rogers, *History of Prices*, vol. 1, pp. 226-234.

[52] Ibid. It should be noted that in his preface, p. xii, Rogers writes: "I must remind the reader that any given year, as 1300, means, as a rule, from Michaelmas 1300 to Michaelmas 1301. . . . It would have been impossible to adopt any other calculation." However, since this would put most dates about a year out of synchronization with today's system of reckoning, and a full year out of synchronization with Titow's, I have added a year to every date given by Rogers for the purposes of comparison.

[53] Rogers, *History of Prices*, vol. 1, p. 217. The price averages for these harvests, that is, the years following each of these harvests, were, respectively, 14s. 10 7/8d., 15s. 11 7/8d., and 11s. 7 3/4d. It will be noted that these prices are considerably less than those quoted by the chroniclers in most instances, but it must be remembered that the chroniclers were less interested in citing averages than in noting extremes. Rogers, *History of Prices*, vol. 2, *passim*, presents the wheat prices on which his annual averages are based, and during the famine period, it is not uncommon, judging by these prices, that wheat sold for some 10s. higher than the average. Thus if the chroniclers' figures are exaggerations, they do not exaggerate by all that much.

[54] Titow, "Evidence of Weather," p. 383. Titow remarks in this study (p. 364) that 1308 was a year "when mortality was high but not 'differentiated,' i.e. was not marked by higher death rates of the poor and was also not obviously related to prices and harvests." This statement is based on a previous study done in conjunction with M.M. Postan on heriots on the Winchester manors (Postan and Titow, "Heriots and Prices," pp. 405-408) and Titow speculates that there may have been some kind of epidemic disease that year ("Evidence of Weather,"

p. 365). It is interesting to note therefore that the *Croniques de London*, p. 34, has the following entry under the year 1308: "In that year there was a great malady of the eyes, from which many people lost their sight. (*En cele an fut graunt maladie des oelz, dont plusours gents perdirent le veue*)."

55 Titow, "Evidence of Weather," p. 383, describes the autumn hesitatingly as "wet?" because only one manor refers to wet autumn weather (*tempus pluviosum*), but the winter flooding indicates that that manor was simply reporting the wetness a little earlier than the others. The yield in 1309 was 4.50 grains per seed grain planted, a positive deviation of 17.49%.

56 Ibid. It should perhaps be mentioned at this point that even before the Agrarian Crisis itself England had been experiencing a certain amount of inflation. Mavis Mate, "High Prices in Early Fourteenth-Century England: Causes and Consequences," *Econ. Hist. Rev.*, 2nd ser., vol. 28, no. 1 (1975), p. 1, states that "from 1305 to 1310 the price of all commodities in England, including wheat, wool, and livestock, rose significantly." Kershaw, "Agrarian Crisis," p. 6, had already noted this inflation among foodstuffs and William Beveridge, "Wages in the Winchester Manors," *Econ. Hist. Rev.*, vol. 7, no. 1 (November 1936), p. 28, had already noted it for wages. (See also E.H. Phelps Brown Sheila V. Hopkins, "Seven Centuries of Building Wages," *Essays in Economic History*, vol. 2, ed. by E.M. Carus-Wilson, p. 172.)

It is difficult to associate this inflation with weather conditions, at least for the first years, and the accepted explanation for it is simply that England experienced an influx of silver at this time (Mate, "High Prices," p. 1, and Kershaw, "Agrarian Crisis," p. 6). Michael Prestwich, "Edward I's Monetary Policies and their Consequences," *Econ. Hist. Rev.*, 2nd ser., vol. 22, no. 3 (December 1969), pp. 414-416, points out that the influx of silver was due primarily to a favourable balance of trade in wool. This factor began to decline in importance when the wool trade began to drop in 1313 (Robert L. Baker, "The English Customs Service, 1307-1343: A Study of Medieval Administration," *Transactions of the American Philosophical Society*, n.s., vol. 151, pt. 6 (October 1961), p. 22.

It is difficult to separate the inflation caused by the increase of silver from that caused by harvest failures. As a general rule, however, it can be stated that the former type of inflation involved only slow and steady price increases. Any sudden or dramatic increase must be attributed to more immediate causes (Prestwich, "Monetary Policies," p. 414).

57 *Triveti Continuatio*, p. 7.

58 Titow, "Evidence of Weather," p. 363. Titow does not speculate on the reasons for this correlation. However, there are two possible explanations, if not more. One is that the heavy autumn rains

may have leached the nutrients out of the soil at a time when they are normally being replenished by the decomposition of the remains of the year's crop, and another is that the wetness would promote the growth of fungi in the soil which would later attack the crops.

[59] Ibid. In the case of 1310 there may be another explanation for the harvest failure. Le Roy Ladurie, *Times of Feast, Times of Famine*, p. 289, states that cold winters normally do not affect the harvest except in cases where the winter is extremely cold. It is hard to imagine how this would work, but perhaps it is simply a matter of late spring frosts being more frequent after really cold winters.

[60] Titow, "Evidence of Weather," p. 384.

[61] Ibid., pp. 383-384. In both instances the phrase "*pro timore pluvie*" is used.

[62] Ibid., p. 384.

[63] Ibid.

[64] Ibid., pp. 384-385.

[65] See above, p. 49. It is difficult to reconcile the relative quality of the 1314 harvest on the Bishop of Winchester's estates with the gloomy descriptions of that harvest found in the chronicles as well as with the high wheat prices that followed it. Perhaps the explanation is that in some places, among them the Bishop of Winchester's manors, they saved the crops by harvesting earlier than in other places "*pro timore pluvie.*"

Rogers, *History of Prices*, vol. 1, p. 30, points out also that in cases of wet harvests threshing is a much longer and time-consuming task which often results in increased expenses for threshing. This, then, would be the most immediate effect of unseasonal rainfall when it occurs during the harvest period.

[66] Titow, "Evidence of Weather," p. 387. The references to flooding under the year 1317 are unclear as to whether they refer to the summer or to the preceding winter.

[67] Ibid., p. 386.

[68] Ibid., p. 388.

[69] Ibid., p. 387.

[70] Ibid., p. 388.

[71] Ibid.

[72] Ibid. See p. 363 for Titow's evidence that the best harvests follow very dry summers, especially when the summer of the preceding year has been dry as well.

[73] Ibid., p. 389. The yield for 1325 was 4.94 grains per seed planted, a positive deviation of 28.98%, and the yield for 1326 was 5.15 grans per seed planted, a positive deviation of 34.46%.

[74] Ibid., p. 365. The study referred to is: D. Justin Schove and A.W.G. Lowther, "Tree-rings and Medieval Archaeology," *Medieval Archaeology*, vol. 1 (1959), pp. 78-95.

[75] Titow, "Evidence of Weather," p. 365.

[76] In other words, since each sequence of tree rings will form a unique pattern with a series of wide and narrow rings corresponding to the climatic conditions experienced by that tree, this pattern will be very approximately repeated in contemporary trees that experienced the same climatic conditions. Thus a tree that was planted in, let us say, the year 1250 A.D. and felled in 1400 A.D. would have a very similar pattern in its outside rings to the pattern on the inside rings of a tree planted in 1370. By matching outside rings with inside rings one is able in many cases to extend the sequence of tree-ring patterns greatly in both directions from one's starting point, and chronologies covering a considerable period of time can be assembled.

[77] Trees grow wide rings in good growing seasons and narrow rings in poor ones. What constitutes a good season includes a number of different factors, some affecting only individual trees, and some, like temperature and rainfall, affecting whole countries. The former, the "micro-environmental factors" are excluded from the chronologies through the practice of basing the chronologies on as many tree samples as possible. As far as the macroenvironmental factors are concerned, there is the general rule that in southern latitudes, in areas bordering deserts, the width of tree rings depends mainly upon temperature (Geoffrey Dobbs, "The Analysis of Tree-rings," *The New Scientist*, vol. 7, no. 182 [12 May 1960], p. 1214). England's trees tend to be a complex reflection of both factors since the country is situated in an intermediate latitude. However, it has been found that oaks that grow on well-drained sites tend to respond principally to rainfall and therefore can be used as rough indicators of precipitation. (See Le Roy Ladurie, *Times of Feast, Times of Famine*, p. 43.) Nevertheless, climatic conclusions for England must presently be regarded as more tentative than those drawn from tree rings in more extreme climates.

[78] Schove and Lowther, "Tree-rings," pp. 78-79.

[79] Ibid., p. 79.

[80] Ibid., pp. 83-86. The chronology was first roughly dated from the fact that the timbers, which came from oak chests in Westminster Abbey and Westminster College and from a wreck in the Riber Hamble, among other things, came from objects whose date of construction could be estimated with some degree of accuracy. On this basis the dating was afterwards made more precise by matching the excessively narrow rings with known droughts.

[81] Ibid., p. 83.

[82] Ibid., p. 84.

[83] The curves for the medieval period were published in A.W.G. Lowther, "The Date of Timbers from the Spire of Chilcomb Church and from the Wreck in the River Hamble: Some Evidence from Dendrochronology," *Hampshire Field Club and Archaeological Society Paper and Proceedings*, vol. 17, pt. 2 (1951), pp. 129-133. However, the graphs are very crudely hand drawn, in a small format, and only approximately dated, so it is impossible for the reader to draw his own conclusions from them.

[84] The sensitivity of an oak to rainfall variations depends not only on whether it is growing on high well-drained ground but also on the species. Pendunculate oak, *Quercus robur*, tends to be more cold-sensitive than drought-sensitive in most instances, while the sessile oak, *Quercus robur*, tends more towards drought-sensitivity (Le Roy Ladurie, *Times of Feast, Times of Famine*, p. 43). Since Schove's and Lowther's specimens were all obtained from man-made structures--chests, buildings and a boat--they were unable to determine with certainty the species of oak used although their guess is that it is probably *Quercus robur*. Nevertheless, the fact that they were able to match it up with the known famine years is a good indication that their specimens do indeed have the drought-sensitivity that they claim for them (see Schove and Lowther, "Tree-rings," p. 79). Thus, although Schove's and Lowther's study is a primitive one as far as its awareness and response to the special dendrochronological difficulties of Britain are concerned, there is still some basis for attempting to interpret the extreme ring-widths.

[85] Schove and Lowther, "Tree-rings," p. 86, refer to the phenomenon of the extra wide ring consistently appearing after a severe drought year as the "d + 1 rule."

86 C.G. Dobbs, "A Study of Growth Rings in Trees," *Forestry*, vol. 24, no. 1 (1951), p. 25, points out that Lowther's work was at that time "restricted to oak timbers from the drier south-eastern counties of England." This policy appears to have been maintained in Schove's and Lowther's joint study.

87 See note 58.

88 Titow, "Evidence of Weather," p. 365, writes: "The confrontation of these references with the data on tree-rings in the same period discussed by Dr. Schove and Mr. Lowther, while showing some divergences in the case of long-term trends, discloses a striking agreement with practically all the individual instances of the narrow-ring and wide-ring years quoted by them. Thus the years 1236, 1245, 1288, 1319 and 1333 cited as years of very narrow rings representing droughts, and the years 1237, 1249 and 1299 cited as years of wide rings (of the dry + 1 type) correspond exactly to the weather conditions for those years as described in the Winchester Account Rolls."

There is certainly not an exact correspondence for the year 1319. In fact, Titow's description for 1318 fits the 1319 ring better. Perhaps he had forgotten about his own dating adjustment when he noted that "exact correspondence."

The narrow ring for 1319, however, fits the pattern that the year 1318 began, a pattern of warm dry summers that continued for a few years, the years of the animal mortality.

89 Lamb, *Climate: Present, Past and Future*, vol. 2, p. 448, points out that "the increased wetness of the summers in England after about 1300 undoubtedly meant a general increase in the wetness of the ground--owing to reduction of the evaporation season." Thus, in order to have anything approaching a drought at that time it would be necessary to have a period of significant evaporation, that is, a fair amount of sunshine.

90 The likelihood of such an event, and the impact of it on tree rings, is discussed in J.M. Fletcher's, "Annual Rings in Modern and Medieval Times," *The British Oak*, ed. by M.G. Morris and F.H. Perring, Botanical Society of the British Isles Conference Reports, no. 14 (n.p.: The Botanical Society of the British Isles, 1974), pp. 86, 90. Although caterpillar defoliation can be fairly widespread in certain years, the damage to the affected trees usually results in a cluster of narrow bands rather than in an isolated minimum.

In support of the accuracy of the tree-ring samples in registering drought years Schove and Lowther, "Tree-rings," pp. 87-88, point out the *Annales Cambriae* in the Rolls Series edition described a drought under the year 1231, a drought which the tree rings did not indicate. As a result, Professor J.G. Edwards, Director of the Institute of Historical Research, examined the manuscripts and found the Rolls Series edition to be in error in assigning undated annal entries to certain years.

[91] A chronology beginning with that year appears in John Fletcher, "Tree Ring Dates for Some Panel Paintings in England," *The Burlington Magazine*, vol. 116, no. 854 (May 1974), p. 251.

[92] Among other things, J.M. Fletcher has developed a technique for constructing tree-ring chronologies by measuring the densities of the annual rings through X-radiography. See Fletcher, "Annual Rings," p. 81, and Lamb, *Climate: Present, Past and Future*, vol. 2, p. 52.

[93] The development of the theoretical foundations has resulted in the satisfactory resolution of most of the early problems caused by the complexities of dendrochronological research in Britain to the extent that in 1978 Valmore C. LaMarche, Jr. ("Tree-ring Evidence of Past Climatic Variability," *Nature*, vol. 276, Climatology Supplement [23 November 1978], p. 336), was able to speak very confidently of the potential application of dendroclimatology to Britain. A similar view had also been expressed by Fletcher ("Annual Rings," p. 80).

[94] See note 84.

[95] Fletcher, "Annual Rings," pp. 80-81.

[96] Le Roy Ladurie, *Times of Feast, Times of Famine*, pp. 44-45.

[97] Colin Renfrew, *Before Civilization* (n.p.: Jonathan Cape, 1973; reprint ed., Harmondsworth, England: Penguin Books, 1976), pp. 76-85; Lamb, *Climate: Present, Past and Future*, vol. 1, pp. 24-30; and John A. Eddy, "The Case of the Missing Sunspots," *Scientific American*, vol. 236, no. 5 (May 1977), pp. 85-86.

[98] Renfrew, *Before Civilization*, p. 82.

[99] Ibid., pp. 80-81.

[100] Ibid., p. 82.

[101] Lamb, *Climate: Present, Past and Future*, vol. 1, pp. 18-24; Le Roy Ladurie, *Times of Feast, Times of Famine*, pp. 262-263; Eddy, "Missing Sunspots," *passim*.

[102] Eddy, "Missing Sunspots," pp. 85-87.

[103] Le Roy Ladurie, *Times of Feast, Times of Famine*, pp. 262-263.

[104] Eddy, "Missing Sunspots," p. 86.

[105] Ibid., pp. 80-81; Lamb, *Climate: Present, Past and Future*, vol. 1, p. 22.

[106] Eddy, "Missing Sunspots," p. 88.

[107] Lamb, *Climate: Present, Past and Future*, vol. 1, p. 22.

[108] Eddy, "Missing Sunspots," p. 82, has this to say of sunspots and aurora borealis displays: "Displays of the aurora are linked to the level of solar activity. Below the Arctic Circle the number of nights when the aurora is seen correlates well with the number of spots on the sun." Thus, for the purposes of defining historical sunspot maxima and minima, descriptions of auroras in the records have been regarded roughly as the equivalent of sunspot observations.

The Oriental evidence, especially that from China and Korea, is fuller and more accurately described than that of the medieval West (Schove, "Sunspots, Aurorae and Blood Rain: The Spectrum of Time," *Isis*, vol. 42, pt. 2, no. 128 [June 1951], p. 134), and the total evidence suggests the existence of the medieval minimum quite strongly. It was not, however, as pronounced as the Maunder minimum, and there was a certain amount of sunspot activity during this period. Indeed, the three chronicle references to auroras during the Agrarian Crisis may be an indication that there was slightly more sunspot activity than scientists presently estimate. (See "Chronicle of Lanercost," *SHR*, vol. 8, p. 378; *The Chronicle of St. Mary's*, p. 52; *Flores*, vol. 3, p. 210; and *Chronicon Angliae Petriburgense*, p. 162.

[109] Fred M. Bullard, *Volcanoes: In History, in Theory, in Eruption* (Austin: University of Texas Press, 1962), p. 259.

[110] The relationship between periods of climatic deterioration and times of increased volcanic activity (without reference to sunspots) is discussed in: Gribbin, *The Climatic Threat*, pp. 80-88; Reid A. Bryson, "A Perspective on Climatic Change," *Science*, vol. 184, no. 4138 (17 May 1974), p. 758; Lamb, *Climate: Present, Past and Future*, vol. 1, pp. 410-435; and Lamb, *Climate: Present, Past and Future*, vol. 2, p. 339.

[111] Bullard, *Volcanoes: In History*, p. 259.

[112] Lamb, *Climate: Present, Past and Future*, vol. 1, pp. 431-432; Lamb, *Climate: Present, Past and Future*, vol. 2, pp. 317-318, 339.

[113] Lamb, *Climate: Present, Past and Future*, vol. 2, p. 339.

[114] Ibid., p. 318; Gribbin, *The Climatic Threat*, p. 87.

[115] Lamb, *Climate: Present, Past and Future*, vol. 1, pp. 430-432.

[116] Ibid., p. 412; Lamb, *Climate: Present, Past and Future*, vol. 2, p. 220.

[117] Post, "Meteorological Historiography," p. 731.

[118] *Flores*, vol. 3, p. 341: "*Die Sanctae Trinitatis et in crastinum ejus, sol se demonstravit sanguinei coloris, ita ut posset ambobus semper videri diebus, sed non effudit super terram splendorem suam.*"

[119] "The Chronicle of Lanercost," *SHR*, vol. 8, p. 378.

[120] Lamb, *Climate: Present, Past and Future*, vol. 1, p. 418. A reddish or bluish discoloration of the sun can also be caused by the presence of loess (wind-blown soil and dust) in the atmosphere and by smoke from extensive forest fires (in this case either in Canada or in Russia or Siberia). See Schove, "Sunspots," p. 134 and Lamb, *Climate: Present, Past and Future*, vol. 1, p. 437. Neither would have a climatic effect, however, because the sun-obscuring particles would not enter the stratosphere.

[121] Lamb, *Climate: Present, Past and Future*, vol. 1, p. 418n.

[122] Peter Francis, *Volcanoes* (Harmondsworth, England: Penguin Books, 1976), p. 260.

[123] Lamb, *Climate: Present, Past and Future*, vol. 1, p. 410. The reference is to H.H. Lamb, "Volcanic Dust in the Atmosphere, with a Chronology and Assessment of its Meteorological Significance," *Philosophical Transactions of the Royal Society*, A Series, vol. 266 (1970), pp. 425-533.

[124] Lamb, *Climate: Present, Past and Future*, vol. 1, p. 418.

[125] Ibid., p. 431.

[126] Bullard, *Volcanoes: In History*, p. 252.

[127] Ibid., p. 130.

[128] Bullard (ibid., p. 127) states that "a volcano appears to react with almost human traits, and, as a 'last fling' before becoming extinct, stages a stupendous Pelean-type eruption."

[129] Fred Mason Bullard, *Volcanoes of the Earth* (Austin: University of Texas Press, 1976), p. 211.

[130] Bullard, *Volcanoes: In History*, p. 264.

[131] Ibid., p. 252.

[132] *Collier's Encyclopedia*, 1956, s.v. "Etna."

[133] Lamb, *Climate: Present, Past and Future*, vol. 2, p. 84.

[134] Gordon A. Macdonald, *Volcanoes* (Englewood Cliffs, New Jersey: Prentice-Hall, 1972), p. 449.

[135] Bullard, *Volcanoes: In History*, p. 252.

[136] Macdonald, *Volcanoes*, p. 448.

[137] Bullard, *Volcanoes: In History*, p. 395, summarizes the relationship in these words: "Volcanoes and earthquakes are, then, simply effects or accompaniments to the formation of an island arc, which in turn is one stage in the history of a mountain chain."

[138] Gribbin, *The Climatic Threat*, p. 150. Gribbin, less cautious than most writers, explains the total relationship in these terms (p. 146): "Under appropriate circumstances some earthquake-prone regions of the Earth's crust can be shaken into seismic activity--causing both earthquakes and volcanoes--by the buffeting of the solar wind, acting through its influence on the atmosphere."

[139] Trokelowe, *Annales*, p. 102; Walsingham, *Historia Anglicana*, vol. 1, p. 154; *Triveti Continuatio*, p. 28.

[140] *The Chronicle of Louth Park Abbey*, p. 189.

[141] Ziegler, *The Black Death*, p. 189.

[142] *The Chronicle of Louth Park Abbey*, p. 42.

[143] Barbara W. Tuchman, *A Distant Mirror: The Calamitous 14th Century* (New York: Alfred A. Knopf, 1978), p. 96.

[144] Ziegler, *The Black Death*, p. 13. See also note 32, above.

[145] Lamb, *Climate: Present, Past and Future*, vol. 2, p. 424.

[146] M.J. Ingram, D.J. Underhill, and T.M.L. Wigley, "Historical Climatology," *Nature*, vol. 276, Climatology Supplement (23 November 1978), pp. 330-331.

CHAPTER FOUR

The Animal Mortality of 1319

England experienced successive mortalities of cattle during the period of the Agrarian Crisis. From 1315 to 1325 there were recurring episodes of abnormally high cattle mortality, a situation which might be said to mark off those ten years from the rest of the century. The chroniclers mention excessive cattle deaths in the years of the famine proper, from 1315 to 1317, and again in 1319, but Kershaw's research into the record sources has shown that mortality was high as well in the years 1320, 1321, 1324 and 1325.[1]

It is possible that this may have been a single epidemic of some kind that renewed itself in several surges, but it is far more likely that there were multiple causes at work, and that the cattle died for different reasons at different times. Certainly the chroniclers seem to have thought so, for while a number of chroniclers mention the deaths of cattle as just another burden of the famine years there is a general tendency, even among the same chroniclers, to single out the 1319 episode as an event that is somehow special. Perhaps this was simply because of the proportionately heavy mortality that year, as the author of the *Flores* suggests,[2] but it may also have been due to certain peculiar--even bizarre-aspects of the deaths that occurred in that year. Such is the indication given by Trokelowe's account of

the 1319 mortality, an account which has formed the basis of most later chronicle versions of the event.[3]

> In this plague, this astonishing thing happened: the dogs and crows that ate the corpses of the dead cattle, swelled up on the spot, and having been infected, died. . . . Indeed, it began in Easter time in Essex and lasted for a whole year.[4]

This surprising--one might almost say preposterous--statement from the Trokelowe chronicle is, unfortunately, the most detailed chronicle attempt at describing any precise physical manifestations of the 1319 mortality. Although it does not describe the deaths of the cattle themselves, it does give some clues through its description of the effects experienced by the scavengers who ate from their carcases. It would be tempting, and quite reasonable, to dismiss that aspect of the description at first glance as merely another example of the chroniclers' known love of embellishing a good story, but there is certain other evidence which indicates that the passage should be taken seriously. For one thing, the most startling aspect of the picture that it presents, the *speed* with which death overtook the scavengers, is repeated with respect to the cattle themselves in the chronicle passages that describe their deaths, brief though those descriptions are, and in the non-chronicle sources that deal with the mortality.

Among the few short entries that Galbraith selected and published from the *Historia Aurea* is a passage that tells of the appearance of the cattle mortality in the north during the siege of Berwick in the late summer of 1319. In its words, "it was there that the animal pestilence or destruction was first heard of. In fact, almost

all the wagon oxen that had been brought to the siege suddenly appeared to be dying."[5] That they did die and that they died in numbers is evident from another chronicle passage that deals with the same region and about the same time. This passage, from the Lanercost chronicle, also places an emphasis on suddenness of the mortality, and states that the oxen and cows, "after a little weakness, generally died, and few animals of that kind remained."[6]

This is the extent of the chronicle descriptions of the manner of death in the 1319 mortality. However, a number of the non-chronicle sources dealing with the animal mortality which are cited by Kershaw in his study make some reference to the kind of death experienced by the cattle. Again there is the same emphasis upon its suddenness, although Kershaw does not seem to have attached any significance to it, and makes no mention of that factor himself.

One of the sources cited, for example, is a contemporary poem on the miseries of Edward II's reign, which speaks of

> . . . another sorwe that spradde over al the lond;
> A thusent winter ther bifore com nevere non so strong.
> To binde alle the mene men in mourning and in care,
> The orf deide al bidene (all the cattle died straightaway),
> and maden the lond al bare, so faste,
> Com nevere wrecche into Engelond that made men more agaste.[7]

This may, of course, be a reference to the speed at which the contagion spread, if it was a contagion, rather than the speed of death in individual instances, but the general feeling of the swiftness of events created by the references to death "straightaway" and "so faste" tends to suggest both more than anything. This same feeling is found in a letter from the Abbot of Ramsey to the king in September 1319. In it the abbot complains that the number of animal deaths has deprived the

abbey of the means of tilling its lands,[8] pointing out that with "the sudden pestilence rushing upon our animals they died in such a multitude that the air was infected by the stench of their cadavers, and afterwards there was actually fear of a human pestilence."[9] Kershaw cites a further instance of "sudden pestilence" (*subita pestilentia*) in 1320 or 1321.[10] Thorncroft in Surrey, a manor belonging to Merton College, Oxford, "lost seven out of fifteen oxen "by sudden death" in the same year, along with four out of thirteen cows, four out of nine calves, and both bulls."[11] In this case it is quite explicit that the suddenness refers to the manner of death and not to the speed of contagion, since it was at least a year after the initial onslaught of the mortality. Indeed, taken collectively, the passages quoted above give the impression of a mortality with a very rapid course.

Kershaw advances the opinion, somewhat casually, that the mortality in question was probably caused by rinderpest.[12] He gives no reasons for this hypothesis, but cites R. Trow-Smith's *A History of British Livestock Husbandry* as the source of his information on this particular cattle disease. There it is described as "characterized by twitching, nasal discharge, dysentery, and death on the third day."[13] Little else is said about the disease except that, in England, "the worst attack in the eighteenth century occurred in the 1740's and 1750's"[14] which indicates that it can last quite a while.[15] There is also an outbreak in 1865 mentioned, but there is no reference to the disease in Trow-Smith's first volume, *A History of British Livestock Husbandry to 1700*.[16]

Rinderpest could conceivably be used to explain the general cattle mortality in the ten-year period from 1315 to 1325 since there is a decided lack of evidence for that mortality other than the numerous cattle deaths reported. The evidence for 1319, however, is comparatively substantial, since the mortality of that year (and perhaps of the two following years) attracted greater notice, and is sufficient for us to rule out rinderpest as the "*subita pestilentia*" described by the medieval writers.

It does, admittedly, have a rapid onset and a rapid course. *Hagan's Infectious Diseases of Domestic Animals* states that "rinderpest is usually quite explosive; large numbers of animals are likely to exhibit symptoms almost simultaneously,"[17] and that "death usually occurs between the 2nd and 6th day after the first symptoms are exhibited."[18] Since its incubation period is from three to eight days,[19] the disease would also be able to spread very rapidly, as in fact it did during the known English rinderpest epidemics. But death after at least two days of sickness can hardly be called "a sudden death." Much faster, for example, is anthrax, which in its peracute form, the kind most often experienced by cattle,[20] results in death in one or two hours.[21] Often the anthrax victims fall dead without any prior signs of sickness having been noticed.[22]

Secondly, the mortality may not have been sufficient to indicate rinderpest. It is a disease with a very high mortality rate, and in its acute form, the only form in which it has occurred in England, "a mortality rate of 90 to 100 percent must always be expected."[23] This virulence combined with its "explosiveness," that is, its ability to

infect many members of a herd simultaneously, would have resulted in a widespread and damaging epidemic in which the cattle losses would presumably have been sufficient to raise the price of cattle. However, there is no trace of the 1319 mortality in Roger's price averages. The average price of oxen in 1319 was 14s. 8 1/4d. a head and the price was dropping that year.[24] By 1320 it was down to 11s. 7 3/4d. a head, the lowest it had been since 1307.[25] Similarly, the price of cows was at 9s. 8 1/4d. in 1319, dropping to a low of 7s. 8 1/4d. in 1320, the lowest since 1309.[26] The price of cows and oxen both rose sharply again in 1321, but this can be explained in terms of a general rise in food prices brought on by the harvest failure of that year. The cattle prices appear to have responded very sensitively to the fluctuations in demand, especially as grain shortage increased the demand for meat, and one would expect that they would have responded also, even if not so sensitively, to fluctuations in supply. Kershaw mentions about a dozen instances, culled from his wide-ranging researches, of small cattle herds that were devastated by the mortality (for instance in one manor fifty-six head died out of sixty-five, and in another twenty-three died out of twenty-five),[27] but it is very possible that these are in fact isolated instances, more noteworthy than typical. There is no doubt that Kershaw considers these instances of severe cattle losses to be representative of what took place generally at that time,[28] but in the light of the price information this question must be considered to be very much unresolved. There is still no real proof that the mortality in 1319 was "of epidemic proportions." It may even be that Kershaw's examples are representative of the

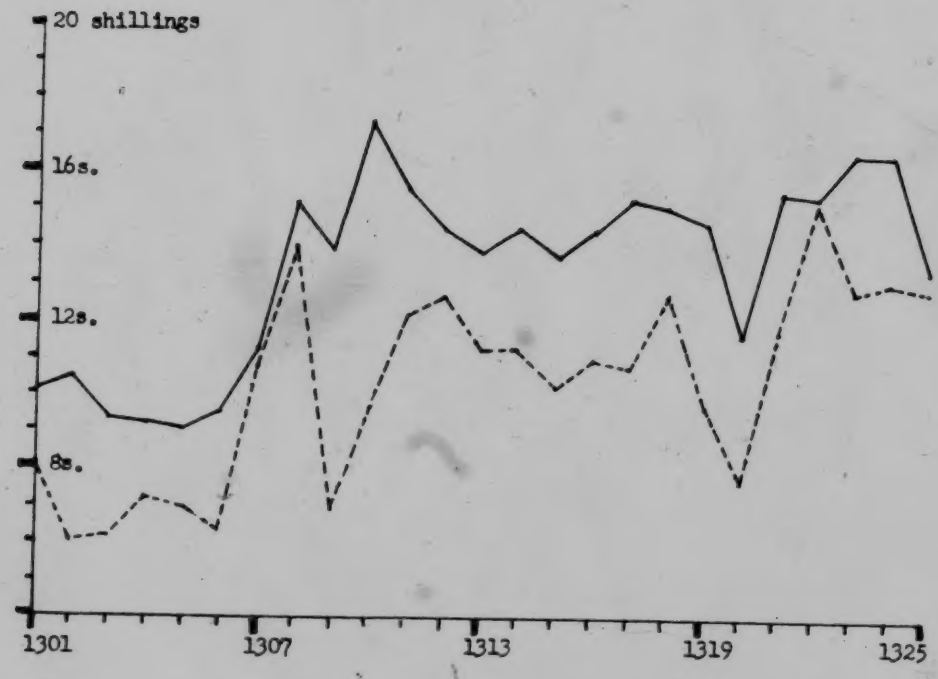

Fig. 2. *Cattle Prices in the First Quarter of the Fourteenth Century.* The solid black line represents the annual averages of the price of oxen, and the broken line represents the annual averages of the price of cows. The averages are those compiled by Rogers, but they have all been advanced a year, as in Fig. 1, in order to correspond more closely with the modern dating system. It will be noticed that the cattle prices reflect the three peaks in the wheat prices quite closely, although there is an unexplained peak in the cattle prices for the year 1308.

localities in which they occurred, and that the mortality was throughout the country, as he suggests,[29] but that the distribution was patchy, affecting some localities rather badly, but leaving most herds in most places unaffected. Certainly, the price of cattle would be a rather crude indicator of animal losses, but it is enough to suggest that the losses of 1319 may have been substantially less than Kershaw believes them to have been.

There is, of course, the possibility that the drop in the price of cattle was due to an influx of tainted meat onto the market. Rogers asserts that the consumption of mutton from sheep that had died from disease was not uncommon,[30] and one may speculate whether the same was true of beef from disease-dead cattle. If it was rinderpest that caused the mortality it would not have made the meat any more dangerous than meat from accidentally-dead cattle, since humans are not susceptible to rinderpest.[31] *The Chronicle of Lanercost* even states that people used to eat the flesh of the cattle that had died in the mortality, "and by God's ordinance, suffered no ill consequences,"[32] but Trokelowe's description, with its picture of dead cattle lying about, and the fear created by the fates of the dogs who ventured to eat it, suggests that the more usual practice, at least in this mortality, was not to eat the victims.[33]

There is, however, a third and far more important argument against the hypothesis that the *subita pestilentia* of 1319 was rinderpest, and that is that a broader spectrum of the animal population was affected than could have been affected by the rinderpest virus. Rinderpest is almost exclusively a cattle disease. Wild ruminants and swine are "said to be mildly susceptible,"[34] and there have been a few large outbreaks among sheep and goats, although they "are fairly resistant to natural infection and seldom are seriously infected."[35] Besides those few hooved animals, however, no other animals are susceptible to rinderpest. The chronicle accounts all speak of cattle as the primary victims of this mortality but they also suggest that a number of other kinds of animals were fatally affected by it. The author of

the *Flores Historiarum* refers to it as an "animal destruction" (*lues animalium*)[36] and in the Tintern copy of the *Flores* this is expanded upon: "There was a very great mortality of animals, that is, of oxen, of cows and of other animals."[37] Walsingham, too, in his *Chronica Maiora* states that it is a general "animal plague" (*pestis animalium*) even though cattle are the principal victims.[38] The chronicles do not explain which other animals were affected, although one may presume that their concern was primarily with commercially important livestock. The two chronicles that give examples of the deaths of other animals, however, take the discussion even beyond the farmyard. Trokelowe, as has been shown, described the deaths of dogs and crows, albeit indirectly, and the author of the Lanercost chronicle states that in the south of England "birds were found dead in great numbers."[39] These deaths could not have been caused by rinderpest; nor would dogs swell up and die from eating of the carcases of rinderpest victims.[40]

Anthrax, however, is known to affect many other animals besides cattle, its principal victims, and for this reason deserves real consideration as a possible explanation for the 1319 mortality. Not only does it cause sudden death among cattle, but it can also attack "all the domesticated animals and man, while numerous of the wild animals are also liable to the disease."[41] According to *Black's Veterinary Dictionary*, from which the above information is obtained, "the order of frequency among other animals [after cattle and sheep] is horse, pig, dog (including the fox), cat, rabbit (tame and wild), and the guinea pig."[42] Even birds can be infected.[43]

There are two characteristics of anthrax outbreaks that make the disease especially interesting for this study. In the first place, it is known that dogs are relatively unsusceptible to infection by the anthrax bacillus except in instances where they have consumed heavily contaminated meat, such as the raw meat of animals that have died from it."[44]

> In these cases the organism apparently enters the tissues from the upper part of the digestive tract, probably through the tonsils, and the disease is manifested by an inflammatory edema of the tissues of the head and neck. Often these regions become greatly distorted and swollen, and suffocation may occur through severe edema of the glottis.[45]

In other words, dogs feeding on the carcases of anthrax victims would become infected, their throats would swell up, and in some cases they would die relatively quickly, of suffocation. This may have been what Trokelowe was describing.

The other characteristic is the relationship that has been found between the incidence of anthrax and certain weather conditions. "Outbreaks frequently follow the hot, dry summer with its scant growth of herbage, which necessitates grazing close to the soil."[46] (Anthrax spores can survive for years in the soil and the disease is spread through their consumption.)[47] Furthermore, "periods of rainy weather followed by extremely hot weather also appear to favor the occurrence of the disease."[48] These weather conditions describe very well what appears to have been the situation in 1319. Not only was the summer very likely hot and dry, as has been shown, but that summer, as with the previous summer which was also hot and dry, can be said to have followed what was a rainy period on a grand scale, the exceedingly wet

period of the famine. One might say that the weather conditions during this period were exaggeratedly ideal for an anthrax outbreak.

There are some factors, however, which militate against anthrax as being the best explanation of the *subita pestilentia* of 1319. First of all, anthrax normally does not spread very rapidly and its occurrence is primarily in isolated instances. "Cases in one lot of cattle usually occur singly,"[49] since the disease is normally not communicated directly from one animal to another.[50] In exceptional instances, however, outbreaks can be widespread enough to resemble an epidemic and in those years, according to one authority, "the disease may assume a virulent form, appearing simultaneously at a number of places, spreading rapidly to new areas, and causing heavy losses of livestock."[51] But it would be a most extraordinary outbreak to be able to bring about the simultaneous infection of a great many of the wagon oxen at the siege of Berwick, for example. Secondly, if the author of *The Chronicle of Lanercost* is correct in stating that people were able to eat the meat of the victims with impunity then the animals in question were assuredly not anthrax victims. Humans are quite susceptible to anthrax and can pick up the spores from handling the carcases.[52] They can acquire the bacillus as well by eating contaminated meat,[53] even if it has been cooked.[54] And thirdly, while birds can be infected, they "possess a considerable degree of immunity."[55] Thus it is plausible that the crows feeding on the victims would die, as Trokelowe states, but it is unlikely that there would be mass deaths of birds as *The Chronicle of Lanercost* describes.

There is another possible explanation for the 1319 mortality which merits consideration here. Modern veterinary handbooks and dictionaries invariably point out that in cases of sudden death among cattle poisoning should also be suspected.[56] Very rapid deaths can often be an indication that an alkaloid is involved. While it is beyond the scope of this study to examine every known cause of rapid or sudden death among cattle, whether caused by bacteria or by toxins alone, there is one kind of poisoning which will be examined in some detail here because of its ability to bring about very rapid cattle deaths and in large numbers. This is poisoning through the drinking of toxic blue-green algae.

Blue-green algae are found in almost all waters everywhere, but especially in the stagnant waters of lakes or the sloughs and ponds that are the favoured drinking holes of cattle. Under certain conditions, especially during periods of rapid algal growth,[57] concentrations of blue-green algae containing lethal toxins can form. Most commonly implicated in cases of fatal algal intoxification are the three species of blue-green algae known as *Anabaena flos-aquae*, *Aphanizomenon flos-aque*, and *Microcystis aeruginosa*. All three are found in the lakes and ponds of Britain, sometimes in abundance,[59] and even though no toxic algae blooms have been reported from England in our own time, there is every reason to believe that they could occur there, and furthermore, that they could have occurred there in the fourteenth century.

Toxic algae have only recently become the subject of intensive scientific study, but already much is known about them. Toxic

blooms--fast-growing accumulations of toxic algae which discolour the surface of the water--have been recognized to be "virtually worldwide in occurrence."[60] Toxic blooms have been known to form in water bodies of all sizes ranging from large lakes to mere farm dug-outs.[61] And while toxic blooms cannot, of course, spread from one unconnected body of water to another in the manner of a contagious disease, they can form simultaneously in distinctly separate places, presumably through the presence of similar growth conditions. For example, there were reports of toxic algae blooms in nine different areas of Saskatchewan in 1959.[62]

There are a number of points of correspondence between the chronicle accounts and known instances of algal intoxification. In cattle, the most commonly reported livestock victims, death occurs very rapidly, usually within twenty-four hours of ingesting toxic algae.[63] However, cattle that have been drinking freely from contaminated waters are often dead as quickly as twenty minutes after drinking.[64] Before the toxins--and there are a number of different toxins involved[65]--were isolated and identified, scientists fittingly referred to the cause of death as the algae's "fast-death factor."[66] Furthermore, if a herd, or a number of cattle, drink at the same time, as is generally the case, they will fall sick simultaneously and most of them will die the same day. This element of mass death fits well with the feeling of simultaneous sickness and death in the chronicle description of the deaths among the oxen at the siege of Berwick.

The number of deaths from this cause in one region or country can sometimes be substantial. The Union of South Africa, for example,

has been affected dramatically by toxic algae blooms, and "in the northeastern Orange Free State and southeastern Transvaal, many thousands of stock, principally sheep and cattle, have died from being poisoned by toxic algae."[67] This took place between 1940 and 1945.[68] It should also be pointed out that the mortality from such a cause would, in fact, have been significantly higher in the Middle Ages if it had taken place then. This is because in our own time, because of the growing awareness of the lethal potential of algal blooms, livestock are immediately removed from access to toxic waters at the first symptoms of algae poisoning, and this reaction prevents many deaths that would ordinarily have occurred in a time when the association between cattle deaths and algae blooms had not been made. An example of this would be a case which occurred near Edmonton in 1962. After a horse and two cattle died suddenly a veterinarian ordered the local livestock removed from access to the poisonous lake that was the cause of the deaths. At the time sixty-six cattle were quite sick, and six more died within twenty-four hours,[69] but if it had been even a century earlier that this had occurred one might reasonably argue that all sixty-six head would have died instead of only six.

Another point of similarity with the chronicle accounts is the number of different kinds of animals that can die from algae poisoning. As has been stated, cattle are the most frequently reported victims, and this is probably because they are liberal water-drinkers compared to most kinds of domestic animals, and while horses and pigs are usually given water by humans, and quite often well-water at that,

cattle generally fend for themselves, drinking indiscriminately from stagnant ponds, sloughs, and whatever else is handy. Nevertheless, horses, sheep, pigs, dogs and poultry are regularly among the victims of algae poisoning. Observations have been made that sheep die in "one to six or eight hours; horses, eight to twenty-four hours; dogs, four to five hours; pigs, three or four hours."[70]

An especially strong indication that the deaths in 1319 may have been caused by algal poisoning is the fact that the animals that are among the victims often include birds and fishes. Mass deaths of these animals have been reported in connection with toxic algae blooms, almost exactly as described in *The Chronicle of Lanercost*. Immediately following its description of cattle deaths, it states:

> At the same time sea fishes were found dead on the shores in great multitude, whereof neither man nor other animal nor bird did eat. Also in the southern parts of England the birds fought most fiercely among themselves, and were found dead in great numbers.[71]

First of all, bird deaths similar to those described by the Lanercost chronicler have been reported in a number of cases of toxic algae blooms. One of the most dramatic examples occurred in October 1952 at Storm Lake, Iowa, and the final tally of bird deaths on that occasion amounted to some 5,000 to 7,000 gulls, 560 ducks, 400 coots, 200 pheasants and a multitude of songbirds.[72] Incidentally, the report on this event in the *Iowa State College Veterinarian* contains a statement which is oddly reminiscent of Trokelowe's description, at least in its sense of immediate observation: "A dog was seen drinking from the lake at the time the birds were being gathered and died

only a few yards from the shores while trying to escape the workers."[73] There are many similar reports of widespread wildfowl deaths from algal toxins, and they range from such places as the Amersfoort district in South Africa in 1927[74] to northeastern Colorado in 1939 where a toxic water-bloom left "numerous dead fish and dead wild birds."[75]

It is a frequent occurrence that dead fish line the shores of lakes and ponds when toxic algal blooms have formed.[76] At first it was believed that the fish deaths were merely the result of anoxia caused by the algal blooms blocking out the sunlight, but it has now been demonstrated that the fish are sometimes directly killed by the toxins.[77] In any case, however, algal blooms are often accompanied by shorelines littered with dead fish exactly as described by *The Chronicle of Lanercost.*

Of course, it must be admitted that Sir Herbert Maxwell's translation of the passage suggests that it was marine fish, not freshwater fish, that were dying in numbers, and only the deaths of freshwater fish would be relevant to the question of toxic blue-green algae blooms. If indeed the Lanercost chronicler is describing a situation in which dead fish lined the coast of either the North Sea of the Irish Sea the most probably explanation would be that a red tide, literally an oceanic algae bloom,[78] had occurred, similar to the one that occurred along the Northumberland coast in 1968.[79] But in the face of the indications that suggest that there may have been a number of freshwater algae blooms in England in 1319 it is reasonable to argue that this further evidence of algal intoxification, the fish

mortality, is also evidence of freshwater blooms, and that it is freshwater fish that died. It is certainly not improbable that the Lanercost chronicler's account is a slightly confused one. Relying upon information that had most likely been transmitted to him orally, the chronicler may very well have been misinformed on this detail, or have jumped to an erroneous conclusion himself.

Another piece of circumstantial evidence that supports the toxic algae hypothesis, even though it supports the anthrax hypothesis as well, is the weather evidence. Toxic algae blooms have been found to occur when there are good growing conditions for the algae, and central among these conditions is the presence of "warm, sunny weather"[80] and ample nutrients in the water.[81] As has been shown, there is definitely evidence for describing the weather that prevailed in the summer of 1319 as warm and sunny, and one may very well presume that the rains of the previous years had filled the ponds and stagnant waters with nutrients leached from the soil, and that in the warmth of 1319 these were rapidly becoming concentrated due to the evaporation.

The most important piece of chronicle information for any interpretation of the 1319 animal mortality, however, remains the description provided by John Trokelowe, which, because of its visual detail, has an air of authenticity that suggests accurate observation. Regardless of whether Trokelowe himself actually saw the dogs eating the carcases or whether he was only transmitting what someone else saw, and regardless of whether it was only a single occurrence being described or many,[82] that passage's vividness and sense of presence argues that it is an accurately conveyed eyewitness description.

It is definitely possible to interpret this passage with real correspondence of detail using the hypothesis of death by toxic algae. The speed of death with which the carrion-eating dogs were affected is a strong argument for poisoning of some kind. So, at any rate, thought Walsingham, for when he was writing about the 1319 mortality in his *Chronica Maiora* some sixty years after Trokelowe wrote, he reproduced Trokelowe's account almost verbatim but added the editorial comment that the dogs and crows "swelled up on the spot, *as if poisoned.*"[83]

Let us, then, attempt to reconstruct what possibly took place. Dogs were devouring the carcase of either a cow or an ox that had recently died from ingesting algal toxins. They died shortly afterwards as a result and the cause of death in their case must have been the same toxins because it appears that they fell dead on the spot, that is, within a short distance from the carcase. The chronicle passage only says that they were infected and swelled up on the spot, it does not specify where or when they died. But that would be a strict, or "legalistic," reading of the description; the whole impression given is both that the dogs were "infected" right away and died right away.[84] If that is the case, it is likely that the action of the poison was felt within an hour, roughly, of the time at which they began to consume the animal, for one would assume that they would have wandered off immediately after they had eaten their fill unless they had begun to feel ill effects immediately. Furthermore, death by algal intoxification is usually preceded by convulsions or spasms and "stupor and unconsciousness"[85] and hence this, combined

with the speed of death, would explain why the dogs died "on the spot." Consequently Trokelowe's statement that "the dogs and crows that ate the corpses of the dead cattle, swelled up on the spot, and having been infected, died" is a strong argument for the presence of the "fast-death factor" and its accompanying manifestations.

But what can be said of the swelling involved? Autopsies of victims of algae poisoning generally show no "gross pathology" to be present,[86] but as a rule it is found that the liver of the victim is swollen.[87] The swelling can in fact be pronounced, and an onlooker could very well notice this on the dogs as a swelling of the abdomen.[88]

One more detail must be mentioned before this modernized reconstruction of what may have inspired Trokelowe's account is complete. It is hard to imagine a situation in which a dog could fall victim of algae poisoning merely by eating the flesh of a victim, and certainly the facts will bear out that this in itself is not sufficiently toxic to cause serious problems. Indeed, macerated tissues of victims have been fed to small test animals in the laboratory without any ill effect on them.[89] This would not be the case, however, with liver tissues which would contain concentrated amounts of the deadly toxins that had been removed from the bloodstream in the last hours or minutes of the victim.[90] Hence, it would only have been when the dogs devoured the liver of the cow or ox that it would have proved fatal to them. Similarly, it is also possible that the dogs could have died if, after they had eaten, they drank from the same water that had killed the cows.

It may seem excessive to devote all this attention to the particulars of a single chronicle passage, but the point is mainly to demonstrate that every phrase of the key chronicle accounts, especially in this case Trokelowe's account on the subject as well as that in *The Chronicle of Lanercost*, have a considerable bearing on the discussion, and even though they cannot tell us conclusively what the *subita pestilentia* was, they can still narrow the alternatives significantly. They can provide the means of sharpening the focus of the discussion to a remarkable extent.

Anthrax and algae poisoning both fit the chronicle picture very well, and the latter fits best of all. In either case, however, the appearance of the correct symptoms and clinical manifestations in the chronicle accounts indicates that these accounts may very well be based upon good observation. The credibility of the chronicles must be enhanced in this instance merely by the evidence that what they describe is indeed possible, even probable.

Still, the question of what the 1319 mortality actually was remains an open one. If the death rate among cattle found so far among the manorial records investigated is eventually shown to be typical and universal for England, then the conclusion must inevitably be that the disease in question was rinderpest and that the chronicle accounts are wrong, or at least that the chroniclers have described animals dying from the wrong disease as being typical for the whole mortality. If, on the other hand, it is shown that the death rate so far found in the records is not universal or typical, then the chroniclers' accounts would be sufficient to rule out rinderpest. Some

evidence that the latter alternative may indeed be the case has already been presented here, although the question must still be considered unresolved.

For the present it is sufficient to conclude that the careful use of the chronicle passages, especially in the light of recent advancements in scientific knowledge, can give a great deal of new precision and depth to this discussion, and the discussion of the Agrarian Crisis as a whole.

NOTES TO CHAPTER FOUR

[1] Kershaw, "Agrarian Crisis," pp. 14-15. Kershaw also points out (p. 15) that there were some areas where cattle mortality was reported in 1326 and 1327 as well, although he does not consider these to be representative.

[2] *Flores*, vol. 3, p. 187.

[3] See, for example, Walsingham, *Historia Anglicana*, vol. 1, p. 156; Walsingham, *Ypodigma Neustriae*, p. 252; and John Capgrave, *Chronicle of England*, ed. by Francis Charles Hingeston, RS, no. 1 (London, 1876), p. 185.

[4] See Chapter Two, note 47, above.

[5] Literally, "the . . . oxen . . . were suddenly as if they were dying." See Galbraith, "Extracts," p. 210. The passage in its larger context is as follows: "*Circa mensem Augusti rex Edwardus exercitu congregato Berewicum obsedit et, nisi pacis perturbatores inter ipsum et comitem Lancastrie Thomam discordiam seminassent, urbem ut dicebatur proculdubio subiugasset. Ibi enim pestis sive lues animalium prius est audita. Omnes revera fere curruum boves ad obsidionem ducti subito quasi moriebantur.*"

The wording is ambiguous really as to whether they took ill suddenly or died suddenly. Kershaw, "Agrarian Crisis," p. 14, is of the opinion that it means that they died suddenly. So, apparently, was the author of the Lanercost chronicle, who appears to have been aware of this passage when he wrote his own account, for he uses the same key words. The "*subito quasi moriebantur*" of the *Historia Aurea* becomes "*quasi subito moriebantur communiter*" in the Lanercost chronicle in order to clear up the ambiguity. See note 6 below.

[6] *Chronicon de Lanercost, 1201-1346*, ed. by Joseph Stevenson (Edinburgh: Bannatyne Club, 1839), p. 240. The passage, in its fuller context, is as follows: "*Eodem tempore pestis et mors pecorum, quae per duos annos praecedentes fuerat in partibus australis, accidit in partibus borialibus, de bobus et vaccis, ita quod post modicam infirmitatem quasi subito moriebantur communiter, et pauca animalia illius generis remanserunt, ita quod oportuit homines illo anno arare cum equis.*"

In previous passages quoted from the Lanercost chronicle the translation by Sir Herbert Maxwell has been used. In certain cases,

however, it has been necessary to recheck that translation against the original, and in this instance Maxwell's translation was found to be a poor one. It runs as follows: "At the same time the plague and the murrain of cattle which had lasted through the two preceding years in the southern districts, broke out in the northern districts among oxen and cows, which, after a short sickness, generally died; and few animals of that kind were left, so that men had to plough that year with horses" ("Chronicle of Lanercost," *SHR*, vol. 8, p. 399). Maxwell ignores the key phrase "*quasi subito*," leaving it untranslated.

[7] Kershaw, "Agrarian Crisis," p. 14. The quoted passage is from *The Political Songs of England*, ed. and trans. by Thomas Wright, The Camden Series, no. 6 (London: The Camden Society, 1839), p. 342. It should be noted that it is not necessarily the 1319 mortality that the chronicler is referring to, although it is apparent from the chronicle accounts that it was the cattle deaths of that year that made the greatest impression on contemporaries. Presumably, this poet was no exception.

[8] Kershaw, "Agrarian Crisis," pp. 24-25.

[9] J. Ambrose Raftis, *The Estates of Ramsey Abbey*, with a preface by M.M. Postan, Pontifical Institute of Mediaeval Studies' "Studies and Texts" series, no. 3 (Toronto: The Pontifical Institute for Mediaeval Studies, 1957), p. 319. The relevant passage from the Abbot of Ramsey's letter reads: ". . . *ac deinde subita pestilentia in animalia nostra irruente, in tanta multitudine mortua sint, quod aer ex fetore cadaverum infectus sit, et de pestilentia hominum postmodum verisimiliter timeatur.*"

[10] The mortality that attracted the attention of the chroniclers *sub anno* 1319 may very well have lasted beyond that year, continuing into 1320 and perhaps 1321, although it would not have been at the same level in those years.

[11] Kershaw, "Agrarian Crisis," p. 25.

[12] Ibid., p. 24.

[13] R. Trow-Smith, *A History of British Livestock Husbandry 1700-1900* (London: Routledge and Kegan Paul, 1959), p. 318.

[14] Ibid., pp. 186-187.

[15] Cf. ibid., p. 35.

[16] R. Trow-Smith, *A History of British Livestock Husbandry to 1700* (London: Routledge and Kegan Paul, 1957).

[17] *Hagan's Infectious Diseases*, p. 959.

[18] Ibid., p. 960.

[19] Ibid.

[20] William C. Miller and Geoffrey P. West, *Black's Veterinary Dictionary*, 4th ed. (London: Adam and Charles Black, 1956), p. 49.

[21] *Hagan's Infectious Diseases*, p. 193.

[22] *The Merck Veterinary Manual*, p. 389; Miller and West, *Black's Veterinary Dictionary*, p. 49.

[23] *Hagan's Infectious Diseases*, p. 960.

[24] Rogers, *A History of Prices*, vol. 1, p. 345.

[25] Ibid.

[26] Ibid.

[27] Kershaw, "Agrarian Crisis," pp. 24-25. Each of these instances represent considerable long-term damage since the herds in question would have been built up and maintained over the years and losses of this nature would have taken a considerable amount of time to make good again. It is not true, as some older texts on medieval history would have us believe, that these would have been slaughtered in any case in the fall and therefore represent a loss only for the one year. As Trow-Smith, *Husbandry to 1700*, pp. 129-130, puts it: "There is rarely contained anywhere in the mass of transcripts of seigneurial farming which have been printed from the richest collections of medieval manuscripts in the world, any hint of the 'great autumn killing' of livestock which has been described so patronizingly and so frequently by the economic and social historians. . . . Every year from each vaccary 'the old cows with bad teeth, and the barren, and the draft of the young avers that do not grow well' were culled, fattened and killed; but this was, and is, good farm practice, and not an enforced and catastrophic holocaust."

[28] Kershaw, "Agrarian Crisis," p. 24.

[29] Ibid.

[30] Rogers, *A History of Prices*, vol. 1, p. 54.

[31] Or so it would seem. *Hagan's Infectious Diseases*, p. 967, states that there have been no human cases of the disease recorded.

[32] "Chronicle of Lanercost," *SHR*, vol. 8, p. 399.

[33] Trokelowe, *Annales*, pp. 104-105; he even exaggerates the fear of contamination to the point of saying that people would not even eat the meat of healthy cattle that year. It is scarcely credible that such an extreme reaction would have been common, especially in a society that had just come through a record-breaking famine, and in a society that regarded meat as the best food for the sick, because of the health-giving and restorative properties it was believed to have.

[34] *Hagan's Infectious Diseases*, p. 958.

[35] Ibid.

[36] *Flores*, vol. 3, p. 186. It should be noted that "*lues*" means "a spreading evil or destruction of some kind," and therefore, through its application to the most common kind of spreading evil, that is, to pestilence, it has acquired that meaning as well. Like *mortalitas*, however, it is a non-commital term and can include such non-pestilential occurrences as widespread poisoning, or severe malnutrition perhaps.

It is interesting to note that the word murrain (*morina*), that perennial favourite which the nineteenth-century translators, editors, and margin annotators continually used in imitation of what they believed was the medieval vagueness in all things veterinary, was almost never used by the chroniclers of this period. In fact, it appears that the chroniclers may have had a considerably more precise terminology for animal pathology than they are generally credited with, even though the nuances of their use of their terminology is largely inaccessible after the passage of eight centuries.

Morina, on the other hand, was a technical term of medieval farm accounting, and was used in references to animal losses that were not due to slaughter, sale or theft.

[37] *Flores*, vol. 3, p. 343: "*Maxima mortalitas animalium, id est bovum et vaccarum et aliorum animalium, fuit.*"

[38] Walsingham, *Historia Anglicana*, vol. 1, p. 156, writes: "*Inaudita pestis animalium, dubium unde nata, succrevit in Anglia . . . durans per totum annum et inficiens pene cuncta pecora regionis.*"

[39] See Chapter Two, pp. 83-84, above.

[40] In certain diseases the danger to the host animal is more from the toxins released or produced in the tissues by the deaths of the pathogens involved than from the multiplication and invasion of the living organisms. An example is the microbe *clostridium botulinum* which produces a toxin that is harmful to the carrion-eaters after the demise of the host (botulism). See *Merck Veterinary Manual*, pp. 332, 344. This, however, is only a concern in certain bacterial diseases and not in viral infections.

[41] Miller and West, *Black's Veterinary Dictionary*, p. 48.

[42] Ibid.

[43] *Hagan's Infectious Diseases*, p. 188.

[44] Ibid., pp. 188, 193.

[45] Ibid., pp. 193-194. It should be noted that the passage cited does not state how quickly the dogs would die in such cases and there is no reason to assume that it would be extremely rapid. In Trokelowe's description, however, the suggestion of a speedy death is there, especially since his remarks apply to both dogs and crows. No one would know that the crows died from this cause unless they were dead on the spot, that is, unless the cause took effect, so to speak, before they could fly away.

[46] Rudolph Seiden, *Livestock Health Encyclopedia*, 3rd ed., ed. by W. James Gough (New York: Springer Publishing Co., 1968), p. 25.

[47] Miller and West, *Black's Veterinary Dictionary*, p. 48.

[48] Seiden, *Livestock Health*, p. 25.

[49] Robert Wallace, *Farm Live Stock of Great Britain*, 4th ed. (Edinburgh: Oliver and Boyd, 1907), p. 248.

[50] Ibid.

[51] Seiden, *Livestock Health*, p. 26.

[52] Ibid., p. 27; *Merck Veterinary Manual*, p. 329.

[53] *Merck Veterinary Manual*, p. 329.

[54] Seiden, *Livestock Health*, p. 25, points out that "when exposed to conditions unfavourable to their existence and growth, the A. bacilli form *spores*, i.e., they change to a dormant (resting) state. These spores, which are very resistent to heat, cold, chemical disinfectants, and prolonged drying and which for many years will retain their viability in the soil, in water, on hides, and in storage, will withstand boiling for several minutes. To kill them, a temperature of 275°F. without moisture is necessary for 5 to 10 minutes."

[55] *Black's Veterinary Dictionary*, p. 48.

[56] *Merck Veterinary Manual*, p. 330; Seiden, *Livestock Health*, p. 27. E.G.C. Clarke and Myra L. Clarke, *Veterinary Toxicology* (London: Baillière Tindall, 1975) lists the plants growing in Britain that are highly toxic to cattle and which can cause rapid death. Of special interest are aconite, or monkshood (p. 353), yew leaves (p. 364), and hemlock (p. 366). The toxic properties of all of these, however, were presumably well-known to fourteenth-century farmers, especially since the knowledge of herbal properties might be considered to be a medieval specialty.

[57] John M. Kingsbury, *Poisonous Plants of the United States and Canada* (Englewood Cliffs, New Jersey: Prentice-Hall, 1964), p. 60.

[58] Ibid., p. 61; Morton Schwimmer and David Schwimmer, "Medical Aspects of Phycology," *Algae, Man, and the Environment*, ed. by Daniel F. Jackson (Syracuse, New York: Syracuse University Press, 1968), states that "the genera of blue-green algae incriminated have been *Nodularia, Rivularia, Aphanizomenon, Oscillaria, Anabaena, Microcystis, Coelosphaerium,* and *Nostoc*" (p. 284).

[59] G.S. West, *A Treatise on the British Freshwater Algae* (C.U.P., 1904), pp. 327-328, 350.

[60] Paul R. Gorham, "Toxic Algae," *Algae and Man*, ed. by Daniel F. Jackson (New York: Plenum Press, 1964), p. 308. Schwimmer and Schwimmer, "Medical Aspects," pp. 284-285, state that "the outbreaks of toxicity have been in many different parts of the world, in such diverse locales as Australia, U.S.A., Germany, Union of South Africa, Canada, Hungary, Finland, Sweden, Argentina, Bermuda, Israel, and Russia."

[61] Schwimmer and Schwimmer, "Medical Aspects," p. 284.

[62] Ibid.

[63] D.W. MacDonald, "Algal Poisoning in Beef Cattle," *Canadian Veterinary Journal*, vol. 1, no. 3 (March 1960), p. 110. See also

Gorham, "Toxic Algae," p. 307, and George Francis, "Poisonous Australian Lake," *Nature*, vol. 18 (2 May 1978), p. 12.

[64] Schwimmer and Schwimmer, "Medical Aspects," pp. 280-284; see also William Marcus Ingram and G.W. Prescott, "Toxic Fresh-water Algae," *The American Midland Naturalist*, vol. 52 (1954), pp. 75-87.

[65] Four different toxins have already been recognized and it is expected that more will be found (Gorham, personal communication, 21 July 1977). Some of the toxins are alkaloids (Richard E. Moore, "Toxins from Blue-Green Algae," *BioScience*, vol. 27, no. 12 [December 1977], *passim*), and one is certainly a cyclic polypeptide (Gorham, "Toxic Waterblooms of Blue-Green Algae," *Canadian Veterinary Journal*, vol. 1, no. 6 [June 1960], pp. 235-245, and "Toxic Algae," pp. 307-336.

[66] It has been shown that the "fast-death factor," that is, the fastest acting of the toxins so far isolated, is a cyclic polypeptide, a ring of amino acids that an animal would be incapable of breaking down chemically in the bloodstream or in the liver. See Kingsbury, *Poisonous Plants*, p. 62.

[67] Ingram and Prescott, "Toxic Fresh-water Algae," p. 81.

[68] Ibid.

[69] Gorham, "Toxic Algae," p. 307. Even today algae poisoning may be causing substantially more deaths than it is credited with causing. Schwimmer and Schwimmer, "Medical Aspects," p. 279, state that "there is a tendency on the part of both veterinarian and farmer to attribute peculiar animal losses to causes more widely known and better understood than toxic algal poisoning."

[70] Francis, "Australian Lake," p. 12. Of course, the speed of death varies with the toxin, or combination of toxins, involved, the amount ingested, and the size and type of animal involved. The quotation is merely to show roughly the relative speeds of death of the various common livestock based on an incident in which cattle died in about twenty-four hours.

[71] "Chronicle of Lanercost," *SHR*, vol. 8, p. 399. The Latin text is as follows: "*Eodem etiam tempore pisces maris in magna multitudine in litoribus maris inventi sunt mortui, de quibus non comedit homo, nec aliud animal neque avis. Aves etiam in partibus australibus Angliae fortissime pugnanaverunt inter se mutuo, et in magno numero mortuae sunt inventae (Chronicon de Lanercost*, p. 240)."

[72] Schwimmer and Schwimmer, "Medical Aspects," p. 283.

[73] George S. Firkins, "Toxic Algae Poisoning," *Iowa State College Veterinarian*, no. 15 (1953), p. 151.

[74] Ingram and Prescott, "Toxic Fresh-water Algae," p. 81.

[75] A.W. Deem and Frank Thorp, Jr., "Toxic Algae in Colorado," *Journal of the American Veterinary Medicine Association*, no. 95, pp. 542-544.

[76] See Schwimmer and Schwimmer, "Medical Aspects," p. 309, for a list of fifteen cases of mass fish due to algal intoxification in various places around the world.

[77] Ibid., p. 308; Gorham, "Toxic Algae," p. 308.

[78] Schwimmer and Schwimmer, "Medical Aspects," p. 324. The offending algae in red tides are normally not blue-green algae but mostly flagellates and dinoflagellates. See also Kingsbury, *Poisonous Plants*, pp. 64-69.

[79] *Encyclopaedia Britannica*, 15th ed., s.v., "red tide."

[80] Kingsbury, *Poisonous Plants*, p. 64.

[81] Ibid.

[82] It may be only a single experience that is the basis of this description, although its inclusion in the brief account of the animal mortality is an indication nevertheless that Trokelowe believed that that experience typified the whole.

[83] Walsingham, *Historia Anglicana*, vol. 1, p. 156, emphasis added; the quotation in its larger context is as follows: "*Et quod est auditu insolitum, et fortassis erit futuris incredibile, canes de cadaveribus pecorum morientium comedentes, et corvi, illico intumuerunt, quasi toxicati veneno, et mortui corruerunt.*"

[84] Cf. note 45 above.

[85] Francis, "Australian Lake," p. 12; see also Kingsbury, *Poisonous Plants*, p. 62.

[86] C.P. Fitch, "'Waterbloom' as a Cause of Poisoning in Domestic Animals," *Cornell Veterinarian*, vol. 24 (1934), pp. 33, 34.

[87] Kingsbury, *Poisonous Plants*, p. 63. For descriptions of liver swelling in animals poisoned by algal toxins see MacDonald, "Algal Poisoning," p. 109; A.G. Stewart, D.A. Barnum, and J.A. Henderson, "Algal Poisoning in Ontario," *Canadian Journal of Comparative Medicine*, vol. 14, no. 6 (June 1950), pp. 200-201; and Schwimmer and Schwimmer, "Medical Aspects," p. 295.

[88] It appears that as a general rule the smaller the animal is, the more visible the swelling.

[89] Fitch, "'Waterbloom,'" p. 33; see also Schwimmer and Schwimmer, "Medical Aspects," *passim*.

[90] The organs which process the impurities in the bloodstream, the liver and the kidneys, are usually badly damaged by the concentrations of toxin, especially the liver, and lesions in these organs are usually reported in the autopsies. A cyclic polypeptide would not be broken down in the liver, but even in the case of an alkaloid that normally would be broken down in the liver there would probably be enough intact toxin concentrated in a victim's liver to seriously affect a scavenger. For a similar sequence of events involving humans eating fish livers containing algal toxins, see Morton Schwimmer and David Schwimmer, "Algae and Medicine," *Algae and Man*, ed. by Daniel F. Jackson (New York: Plenum Press, 1964), pp. 393-394.

CONCLUSION

Historians have spent much ink on the personal failings of Edward II and on his failure as a king. In this they have followed the chroniclers closely, for the chroniclers of Edward II's reign emphasized his preference for unkingly activities, his favouritism, his poor record in war, and other shortcomings. This is essentially the picture of Edward II that historians present today, although it has now been modified a little in that a number of excuses are advanced for his failures.

"Edward II sat down to the game of kingship with a poor hand, and he played it very badly."[1] Modern historians would accept this succinct statement by N. Denholm-Young, although they tend to concentrate on the ineptness of the ruler, which is not the concern of this thesis, rather than on "the poorness of the hand." Still, they do admit that he inherited a kingdom that was in great financial disarray. They admit also that he inherited an insoluble Scottish problem as well as a deep and growing tension between the barons and the royal power. And, although it has not been directly cited as an excuse for Edward, historians have also pointed out that England at that time suffered, like the rest of Europe, from some long-term malaises, usually spoken of collectively as "the crisis of the fourteenth century."

This crisis was, for a long time, considered as a consequence of the Black Death which ravaged England in the reign of the king's son,

Edward III. Now, however, it is recognized that in some of its aspects the crisis was present in the reign of Edward II. M.M. Postan, whose voice dominates among English economic historians, has spoken repeatedly of a downturn in population growth beginning around 1300 and caused by the fact that the land was supporting population to the limit of its capabilities, leaving the people at the mercy of soil exhaustion and especially vulnerable to the traditional "Malthusian checks" of war, famine and disease. Among these Malthusian checks was "the famine of 1315-1317" which Postan and his followers have given a certain pre-eminence in the list of unhappy events preceding the plague.

These extenuating circumstances which have somewhat mitigated the harsh judgment of Edward II by modern historians have to a great extent been discovered and reconstructed through the study of record material, that is, manorial accounts, household books, legal records and the like. In this way the general picture presented by the chroniclers has been amplified, and even slightly modified, although it has not been substantially altered in its broad outlines.

A return to the chronicle accounts, however, shows that there are a considerable number of chronicle passages that have been ignored or only slightly touched upon by modern historians. These passages, which together may be said to constitute a distinct category of material, are those passages which describe "acts of nature." They include descriptions of unseasonal rains, magnificent tempests, floods, earthquakes, northern lights, and all the other ominous manifestations that contemporaries generally classed as portents. Whether out of fear of indulging in medieval superstition or because of total

and outright incredulity, historians have generally played down these passages, or disregarded them entirely.

The chronicle accounts of Edward II's reign, however, have more than their fair share of these prodigies and descriptions of unusual natural phenomena. Furthermore, recent researches in the scientific arena, and to a certain extent this includes archaeology in its latest techniques, have shown that these chronicle passages ought to be taken much more seriously that they have been hitherto.

These researches indicate that the meteorological storms of Edward II's reign were indeed unusual in their severity. They reveal also that the cold spells which the chroniclers describe as freezing the Thames on more than one occasion were part of a general cooling of the climate which at that time was affecting northern Europe especially. Furthermore, they document that the three very wet years of 1315, 1316 and 1317 were preceded by other years of excessive rainfall, years which were perhaps not described in such drastic terms by the chroniclers simply because they were not as wet as the three worst years.[2]

Altogether, these researches make clear and manifest that when Denholm-Young spoke of a "poor hand" he was understating extravagantly. "Abominably dismal, even on a cosmic level" would have been a more accurate description, although not as pithy. They also make clear that when Postan and his followers contended that the climatic deterioration, if it happened, would only have been a contributing factor at best to the agrarian decline during that period, they were needlessly complicating the picture. A shortened growing season would suddenly make certain soils marginal that previously had been adequate.

The climatic deterioration and the related events of flooding, famine, and disease must be recognized as having had serious consequences, both economic and military as well as agricultural and demographic. The most obvious were the dramatic rises in prices which came in three waves during this period, but very much in the forefront as well were the widespread starvation and sickness, both causing a sharp rise in mortality. But there are a number of other possible consequences that must be considered as well. For example, flooding forced the shutdown of a number of mines in Europe causing a lasting drop in the production of silver. Sheep losses from disease during the famine years brought wool exports to a new low and salt production deteriorated markedly due to flooding and a lack of evaporation. The inflation exacerbated the conflicts between the king and the nobles and between church and state since everyone involved felt the need of greater revenues as well as the responsibility to curtail the spending of others.

The severity of this last category of Edward's abysmal bad luck, that is, the climatic category, becomes all the more important when one realizes how interrelated all the various meteorological disasters were. A period of general climatic cooling usually manifests itself in the temperate zone by extreme weather conditions, alternating floods and droughts, heat waves and tremendous and unseasonal storms. The whole catalogue of unusual meteorological events in Edward II's reign forms part of a single whole: they constitute the first large-scale manifestation in northern Europe of the cooling that was to lead to the Little Ice Age.

The interrelation of events appears to extend even to the earthquakes reported during this period, for there are strong indications that the climate during the fourteenth century was further worsened by a period of tectonic instability in the earth's crust that involved a greater-than-usual amount of volcanic activity. The frequency of volcanic dust veils in the stratosphere which this would have resulted in would in turn have reduced insolation sufficiently to have made a prolonged difference.

While the climatic cooling was the result of some long-term processes, some of which can be measured in centuries, the particular meteorological manifestations of it that resulted in the famine were relatively short-term. But even then it must be recognized that the famine, or more fully, the Agrarian Crisis, with its immediate agricultural and economic consequences, was considerably longer than the three years it is normally credited with. In order to apeak accurately, one must describe the Agrarian Crisis as lasting from 1309 to 1324, a fifteen-year period covering practically the whole of Edward II's reign.

Similarly, the animal mortality of 1319 can be partially attributed to the particular meteorological conditions of the Agrarian Crisis. If the sudden cattle deaths of 1319 were caused either by anthrax or by toxic algae, as seems likely from the chronicle accounts, then the weather conditions would certainly have been a contributing factor. The very wet years of the famine were followed immediately by a series of drought-like summers, an unusual situation that seems to have had unusual results.

The theory that the cattle died by algae poisoning fits in especially well with the chronicle accounts, even though all of the evidence presently available, chronicle or otherwise, is still not sufficient to prove conclusively what happened. The advantages of this theory, however, are that it explains the similar deaths of other animals besides cattle, particularly birds and fish, and the speed with which death occurred in all cases. Furthermore, it fits perfectly with that key passage in Trokelowe's chronicle describing the unusual deaths of the crows and dogs that ate from the carcases of the cattle.

The theory of algae poisoning, then, like the researches into climatic history discussed above, has a special bearing on the question of the general credibility of the chronicles during this period. The climatic research on the whole confirms the chronicle accounts of the "acts of nature" that occurred in the years of the Agrarian Crisis, and if anything they show that the chroniclers for the most part minimized these events rather than exaggerated them. The toxic algae hypothesis, while not confirming the chronicle accounts since it itself remains unproven, nevertheless demonstrates that what the chroniclers said had happened could indeed have happened. Altogether, therefore, the credibility of the chronicles has been enhanced by the application of recent scientific research to the discussion of these passages. Naturally, not everything every chronicler says can be accepted--even the contradictions between chronicles prove that--but on the whole they are accurate enough, and their interpretations genuine enough, for it to be possible to make them the basis for our

historical reconstruction. In many quarters it has been fashionable to malign medieval chroniclers in general, and those of the reign of Edward II in particular, as gullible and superstition-ridden fools. There is less justification now, in the light of present knowledge, than there ever was, to hold that view.

Furthermore, it should be mentioned that the limitations that the chronicle accounts for this period do have are to a great extent due to the limitations that the chroniclers themselves were working under. Few of the chronicle accounts of the reign of Edward II were written while he was actively ruling. It seems that another of the effects of the Agrarian Crisis was that it hindered or discouraged chronicle-writing, or at least weakened the interest of clerics in recording events. And for the most part, the chronicles that were written during the reign of Edward II dealt with the previous reign rather than with his. The result was that the chronicle accounts of the crisis years were generally written after the event and at a time when the histories of the immediate past were declining in popularity.

In conclusion, then, the evidence presented in this thesis advances a two-fold conclusion. On the one hand, it is clear that the Agrarian Crisis was a much longer, more serious, and more complex event than has yet been recognized. Its consequences penetrated society deeply and endured for many years.

On the other hand, the evidence presented also indicates that the new body of information available, that which I have called the scientific information or "the non-written evidence," holds great promise for a deeper and fuller understanding of the medieval period.

Granted, there have already been a number of situations in which scientific knowledge has been applied to the study of history, but the combination of certain recent researches in science that are ecological and interdisciplinary in scope with the neglected "miscellaneous passages" from the chronicles holds particular promise at this point. This is especially true in connection with the history of Edward II's reign, a reign which can be seen coincidentally as a turning point in the world of climate and nature.

NOTES TO THE CONCLUSION

[1] N. Denholm-Young, *Vita*, p. ix.

[2] Or perhaps because the worst rainfall in those years did not come in time to seriously affect the harvest.

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APPENDIX

A Weather Survey of the Crisis Period

The following is a year-by-year listing of the weather conditions during the years of the Agrarian Crisis as they have been presented in the thesis. Only the years for which abnormal conditions have been specifically noted are included in the list. Also included are some brief notes about prices, harvests, and diseases, which may be indirect indications of the weather that prevailed.

1308.	Wet and long autumn. Poor harvest.
1309.	Very wet and stormy in the autumn. Harvest appears to have been good in some places and bad in others, perhaps depending as much on whether it was taken in in time as on local conditions. Very wide tree rings.
1309-1310.	Very hard winter. Thames froze.
1310.	Spring flooding. Poor harvest. Highest prices before the price-rise of 1315.
1311.	Prices remain at about 1310 level.
1313.	Very wet and long autumn.
1313-1314.	Hard winter.
1314.	Very wet and long autumn. Again harvest appears to have been good in some places and very bad in others. Probably very similar to 1309. Sharp price rise.
1315.	Full-scale famine. Flooding. Incessant rain. Human mortality through hunger and pestilence. Sheep and cattle murrain. Prices soar. Total harvest failure.

1316. Human mortality increases through famine and pestilence. Rain and flooding continue unabated. Sheep and cattle murrain. Prices reach record high. Total harvest failure.

1317. Human mortality reaches highest level. Rains and floods continue. Again there is harvest failure. Sheep and cattle mortality continue.

1318. Human mortality remains high. Very dry summer.

1318-1319. Some winter flooding.

1319. Drought conditions in the spring and summer. Evidence is contradictory, but it appears to have been abnormally dry until the autumn. Narrow tree-rings. Autumn wetness appears to have resulted in a poor harvest in places. Unusual animal mortality affecting mainly cattle.

1320. Very wet and long autumn. Poor harvest.

1321. Harvest failure.

1322. Prices again peak. There is evidence that it was very rainy late in the year.

1325. Very dry summer.